

A. R. A. MECHANICAL DIVISION CANADIAN NUMBER  
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# Railway Age

WITH WHICH IS INCORPORATED THE RAILWAY REVIEW

FIRST HALF OF 1927—No. 27

NEW YORK—JUNE 4, 1927—CHICAGO

SEVENTY-SECOND YEAR

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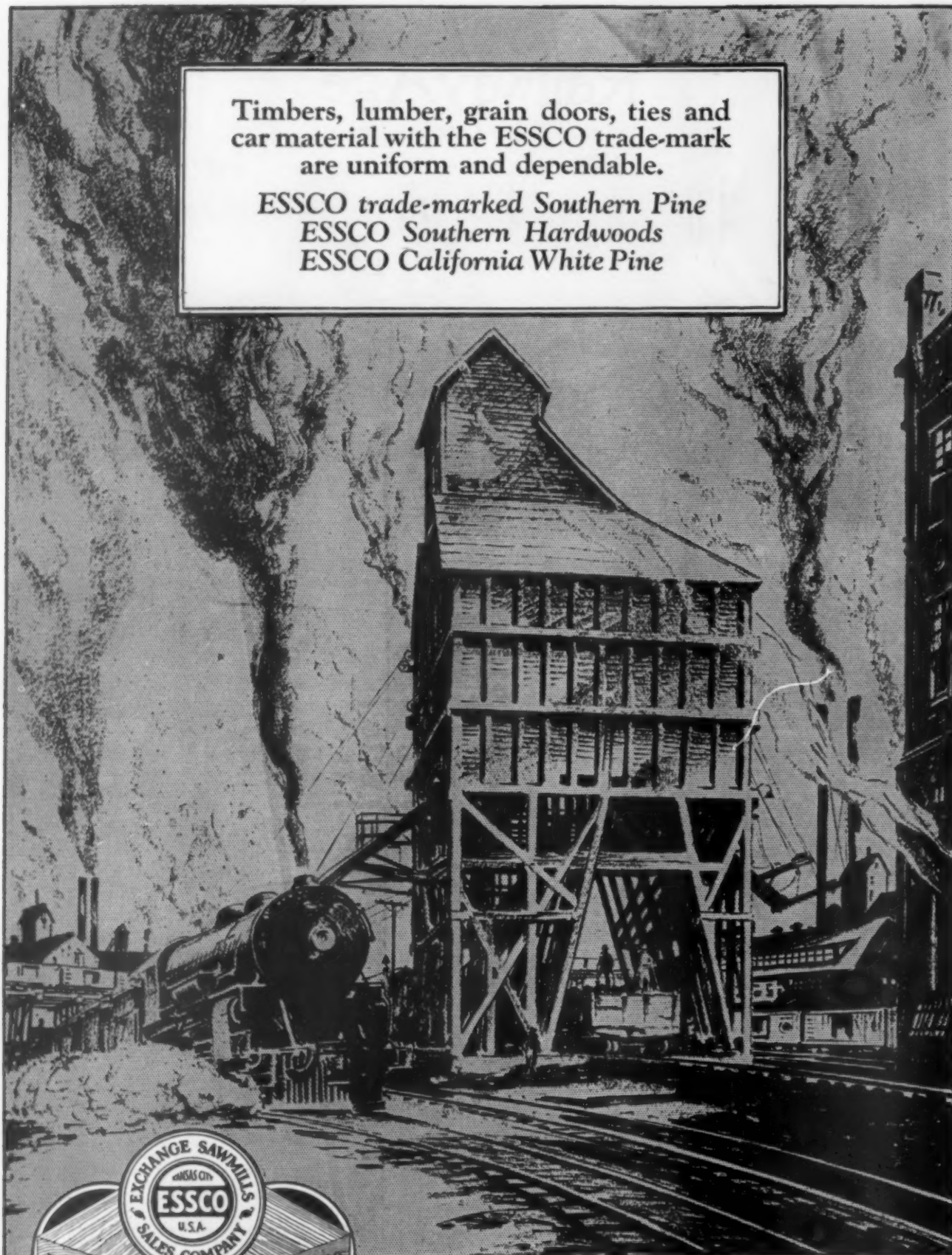
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# Railway Age

Vol. 82, No. 27

June 4, 1927

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## *The Canadian Railways and the Mechanical Convention*

**T**HE selection of Montreal as the place for this year's convention of the Mechanical Division of the American Railway Association is particularly appropriate. The Canadian roads have been active members since inception of the division and its predecessors. This year a Canadian, G. E. Smart, chief of car equipment of the Canadian National, is vice-chairman of the division. Canada will this summer celebrate the sixtieth anniversary of her Confederation into a united Dominion, an event with which the Canadian railroads were directly associated. The Montreal meeting of the Mechanical Division, therefore, pays due recognition to several happy events. In all its sixty years the division or its predecessors have never before met in Canada. Yet on the Canadian roads the members will find much of interest and value. As its part in recognizing the appropriateness of this meeting, the *Railway Age* presents herewith an issue which, while neglecting none of its regular weekly features, adds many pages of articles dealing primarily with the Canadian railways, their problems and accomplishments—seeking, in view of the nature of the convention, in a large part of this material, to view the situation from a mechanical standpoint. The native tongue of many Canadian railroad men is French rather than English, and to them we have a word of greeting in their own language. It is our sincere wish and belief that this convention, meeting under such auspicious conditions, will be most enjoyable and profitable for those who attend. A full report of the proceedings will be published in our next week's issue.

## *Wholesale Classification*

**P**ROMPT and efficient car handling in yards has played an important part in increased operating efficiency. No small part of the improvement is due to intelligent classification, saving many switching hours at intermediate terminals. The classification of cars has developed from a haphazard affair, involving relatively few cars, to a carefully considered system. It is not an uncommon thing, in some yards, to classify as many as 6,000 cars a day when traffic is heavy. At the Clearing yard of the Belt Railway of Chicago, whose operations are described elsewhere in this issue, a daily average of more than 4,000 cars was classified last year. As the number of cars classified increases, the possibilities of error, injuries and damage increase proportionately. Proper supervision and eternal vigilance are vital if waste and losses are to be held down in yards where wholesale classification is performed. Such yards have grown far beyond one-man yards. The directing head must, of course, be an unusually competent officer, well versed in terminal science, but it is equally necessary

that he have a thoroughly competent staff. The organization of a force to supervise operations in a busy yard should be given as much attention as the organization to supervise a busy division, if proper results are to be obtained.

## *Why Stop Trains at Switches?*

**T**HE demand for faster schedules and increased track capacity requires the saving of minutes at different points which frequently aggregate as much as a half hour or more for trains running over a division. The elimination of train stops for the throwing of switches expedites the movement of trains into and out of sidings, especially on adverse grades, and the time thus saved may permit the setting forward of meeting points and advance one or more trains toward the terminal that much quicker. Until within recent years an interlocking plant with an attendant was considered necessary to operate and lock a switch; without it the switch was hand thrown and the train required to stop. Three types of facilities are now being used successfully to permit train movements without stops at outlying switches. Power-operated switch machines controlled by levers in nearby interlocking machines are being used to operate passing track or junction switches outside of the ordinary limits of the interlocking and for distances up to five or six miles. The same type of power switch machine, controlled by desk-lever table interlockers, independent of other interlocking plants, is also being installed extensively to operate passing track and outlying junction switches. The improved buffer type spring switch, properly surrounded with signal protection, is also receiving increased consideration for use on switches at the ends of double track, the leaving ends of passing tracks, and yard leads. At least one of these three methods can be utilized at many points where trains are now being stopped under adverse conditions; the time saved by a few such improvements will be reflected in better train operation on an entire division.

## *Passenger Car Orders*

**T**WO months ago it was pointed out that there were indications that 1927 would be a good year in the passenger car market. At that time orders for passenger cars for domestic use were running ahead of the previous year's orders and there were inquiries out which seemed to insure the placing of several large orders. Now, with the total for the month of May recorded as 261, the excellent prospects for a good year seem, if possible, even better. There has been no better month of May in nearly ten years, and that fact has helped to make the total of passenger cars orders for the first five months of 1927 the highest since the busy year of 1923 when the



figure for five months reached 1,243 cars; the 1927 figure for the five months is 1,039 cars. The total number of passenger cars ordered in 1926 was 1,868 and the highest total of passenger cars ordered in any year since 1913 was 2,554 in 1923. It seems quite probable, therefore, that when the orders of the remaining seven months are added to those of the first five, the year of 1927 will prove to be an exceptionally good one in this respect.

### *Turning a Loss Into a Profit With Buses*

THE beginning of bus operation by the Central of New Jersey on May 22 was interesting, not only because it was the first operation of this character by this railway, but also because the situation which led to the adoption of motor buses was one which is common in all parts of the country. The Jersey Central buses have replaced six trains on the Lakewood, N. J.-Barnegat branch line, and it is estimated that a saving of \$16,000 a year in operating costs will result from the substitution. The not unusual picture of train operating expenses exceeding operating revenues is found in this case. The cost of operation of the three trains replaced was \$36,175 in 1926, while the revenue from their operation was only \$14,935. Assuming that the same traffic will be available for the buses that was carried on the trains, the lower cost of operating buses will enable the earning of an excess over revenue of \$850 in operating net, according to the Jersey Central's estimates.

### *The I. C. C. Changes Its Mind*

MANY toes have been stepped on by the Interstate Commerce Commission in the course of its long and eventful career and many people and interests have come under its criticisms. Some of those who have been criticized, however, may perhaps take some satisfaction from observing that the commission never said anything about most of them worse than its own members say about it, in the concurring, dissenting, partly concurring and partly dissenting separate opinions which are so important a feature of the commission's most important decisions. Moreover, as is indicated by the latest in its series of decisions in the lake cargo coal rate cases, some of those whose toes have been stepped on in the past might have their feelings assuaged if their situations were such as to enable them to obtain a rehearing, after the passage of time has brought about some change in the make-up of the commission or in other conditions. The commission has always held and frequently demonstrated that it is not bound by the doctrine of *stare decisis* and therefore it is free to change its mind occasionally. As the lake cargo decision also indicates, any large case before the commission usually involves such a variety of facts and testimony, besides being governed by so many provisions of law, that once the commission decides to reopen its mind it is not difficult to find a basis either in cost studies or rate comparisons for almost any conclusion desired. The same thing applies also to merger decisions, but the Hoch-Smith rate resolution seems to offer one of the widest fields for commission discretion. Having considered the depressed condition of an industry, or, as in this instance, of part of an industry, a new light may be shed on cost studies, rate relationships or even statutes. And if, as it was held recently by a commission examiner in a proposed report, there are three kinds of reasonable rate levels, maximum rates, minimum rates

and Hoch-Smith rates, the kind of rates necessary to produce a fair return under section 15a would appear to be subject to considerable competition.

## Tendencies in the Design of Locomotives

THE session of the Railroad Division at the Spring Meeting of the American Society of Mechanical Engineers, held at White Sulphur Springs, W. Va., last week, was scheduled too close to the annual meeting of the Mechanical Division of the American Railway Association at Montreal, to insure a large attendance. What the meeting lacked in this respect, however, it made up in quality—that is, those who did discuss the papers were particularly well qualified to do so. Lawford H. Fry's conclusion that the use of locomotive boiler pressures much in excess of 450 lb. per sq. in. were not expedient at this time, seemed to receive approval, except that it was suggested that higher pressures might be used effectively if a successful means could be found of reheating, in connection with the use of superheat in compound cylinders.

The general conclusions of William Arthur in his paper on Diesel traction for railroads included the following statement: "The next few years will show a marked increase in the number of Diesel applications to specific railroad problems, as, for instance, where bad water conditions obtain, and particularly to switching service, to branch lines, and to a lesser extent to heavy main line and terminal services. With larger production and closer attention to design features, cost and weights will tend to reduce. At the same time it is fairly certain that capacities will increase, which, together with multiple-unit operation, will render possible handling of the heaviest freight and passenger trains." Both Mr. Arthur's paper and the discussion which followed its presentation indicated clearly the more important difficulties which it will be necessary to overcome before the Diesel locomotive can come into extensive use in this country. On the other hand, emphasis was also placed on the great possibilities for the Diesel locomotive under certain specific conditions; indeed, one gained the impression that railroad mechanical men are not only keenly interested in its development, but feel that it will eventually be of great assistance in overcoming certain difficulties, which present locomotive designs of both the steam and electrical types cannot adequately meet.

## A Change That Has Come About Quickly

IT is only three years since the Southern Pacific placed an order for 131,000 tons of rails with the stipulation that they should be rolled in 39-ft. lengths. While rails of this length were not novel, for they had been rolled in limited quantities prior to that time, this was the first large order in which it was specified that the entire tonnage should be rolled 39 ft. Prior to this time interest in rails longer than the earlier standard of 33 ft. was growing, and a number of roads had attempted negotiations for rails of both 39 and 45-ft. lengths, but the imposition of a premium for these additional lengths retarded their adoption. The acceptance of the Southern Pacific's order broke the dam, however, and other roads followed with such rapidity that the 39-ft. rail is standard



today and an overwhelming majority of the rails now being rolled are of this length.

The adoption of the longer rail is of importance from several angles. In the first place, it contributes to a stronger and more easily maintained track. It also offers a demonstration of the fact that with the stronger and more scientifically designed track construction of today, the control of expansion is no longer the bug-bear it formerly was. Still more important, however, is the impetus it has given to the use of mechanical equipment for maintenance of way work, for coincident with the increase in the length of the rails there has been a similar increase in their section, both adding to the weight of each individual rail and to the difficulty in handling it. The relaying of rails has long been regarded as the most laborious operation in maintenance work, the handling of rails with tongs taxing the strength of men, limiting their output and increasing the risk of injury. While it was possible to gather a sufficient number of men about a 33-ft. rail of 85-lb. or 90-lb. section to handle it, this is not practical with the 110-lb. and 130-lb. rails of 39-ft. lengths used so largely today. The development of mechanical equipment for the handling of rails made possible the 39-ft. rail. The adoption of the 39-ft. rail has made this equipment essential.

## The Meeting of the Air Brake Association

WHEN the Air Brake convention adjourned its thirty-fourth annual convention at noon Friday, May 27, at Washington, D. C., it closed the largest convention it had ever held, both from the standpoint of attendance and the number of manufacturers exhibiting. The program presented this year was of exceptional merit and in many respects is an indication of the beginning of a new era in the work of this association. What the association is doing and is planning to do is given in the reports of the convention proceedings which were published in last week's issue of the *Railway Age* and elsewhere in this issue. As was brought out by Commissioner McManamy and by R. H. Aishton in their addresses at the opening of the convention, the practices recommended by the Air Brake Association are practically followed by both the Interstate Commerce Commission and the American Railway Association.

Regardless of these facts there are a number of railroads which have not as yet seen fit to give the work of the association proper support. This situation was brought to light during the closing business of the convention when President Belk took a half hour for what he happily termed a "Sandhouse Congress." Most of the deliberations of the Sandhouse Congress pertained to finances and the procuring of new members and it was astonishing to learn that a large proportion of those attending the convention were doing so on their own time and at their own expense. The late W. R. Scott, president of the Southern Pacific, in an address at the 1923 convention of the Air Brake Association held at Denver, Colo., in referring to this situation said, "I think that this is fundamentally wrong—I don't know of any money that could be more judiciously or usefully spent on the part of a railroad than by sending its air brake men to these conventions, thereby encouraging and supporting your admirable educational activities. It is impossible to overestimate the value that would accrue from a practice of that kind. We should encourage a larger attendance at these gatherings."

The inspirational effect and educational value of conventions are obvious. But many roads perhaps do not realize the extent to which they depend on the work of the Air Brake Association for progress in brake operating conditions and maintenance standards. Do any roads wish to continue to participate in these substantial benefits without carrying their share of the burden?

## The Mechanical Division Program

GROWTH in membership, increased attendance at meetings and in general more worthwhile programs have become the rule of the day with almost all of the present railroad clubs and associations. Each convention exceeds its predecessor in size and practical value. From all present indications, the American Railway Association, Mechanical Division convention, to be held this year on June 7-10 at Montreal, Que., will be no exception to the rule. The present membership of the Mechanical division includes 1,241 representatives of 206 railways, 967 affiliated members, and 164 life members, and a substantial proportion of the total membership will no doubt be present to hear and take some part in the program, details of which appear on another page of this issue. The program is notable for the number of distinguished men thereon and for the number and generally admirable character of the reports. With 18 addresses and individual papers and 19 committee reports to be presented in a three-day meeting, the main problem of the delegates obviously will be to assimilate and digest as much as possible of this vast fund of information and put it to maximum service in a practical way when the convention is over and every-day duties must be resumed.

Without the benefit of advance information regarding the subject matter to be presented, it is certain that no one could obtain maximum benefit from the extensive program planned this year by Chairman Silcox. By a special effort, however, some of the committee reports were printed and distributed four weeks before the convention and all except a few of the individual papers were mailed to members ten days in advance of the meeting. This will greatly facilitate the advance study of reports and the preparation of discussion, an opportunity which it is hoped will be fully utilized by the entire membership. The plan of having committee chairmen prepare briefs of their reports which can be read in not more than ten minutes will be tried for the first time at the convention this year and the meetings, devoted almost entirely to the discussion of various points in question, should, therefore, prove of unusual value.

Practically every phase of mechanical department and related activities will be presented in more or less detail during some part of the program. Problems of personnel, education, research, design, construction and utilization of equipment of all kinds, as well as safety, interchange and operation will receive consideration. The desirability of mechanical department men co-ordinating their efforts with those of other departments in the promotion of greater over-all operating efficiency will be stressed, and in this respect, the members of the Mechanical division can hardly do better than to carry to the convention the thought expressed over 20 years ago by H. F. Ball, superintendent of motive power of the Lake Shore & Michigan Southern and president of the American Railway Master Mechanics' Association in 1906, who closed his presidential address as follows:

"Let us remember that we are not merely heads of

departments. We are officials of railroads striving to increase to the utmost the net earnings, and when we have gone to the limits of our ability as mechanical men, we have yet a long way to go in the direction of the operating men to improve the results. By always conducting our department so that the motive power is ready for any emergency we shall help the department, help the other officials and incidentally help ourselves. There is more before us than there is behind us in the way of improvements, and there is no work today lying before any class of men which is more important and more inspiring than that in which we are engaged."

## Returning to Normality Following the Flood

IT is only natural, under the circumstances, for the newspapers to over-emphasize the far-reaching effects of the Mississippi flood. Despite the hysteria displayed by the papers in reporting the flood, and their claims of tremendous damage to railway property and of serious interruptions to service, the railways in the flood zone have managed, throughout the disaster, to keep freight routes open and to maintain approximately schedule service. None the less, some of the railways have suffered serious traffic losses through misconception on the part of the shippers as to the true situation. Many unthinking shippers, unfortunately, have read of the losses in the affected section and jumped to the entirely erroneous conclusion that the railways which operate in part in the flood zone are entirely out of business. Nothing could be farther from the truth. Main lines, even in the flooded areas, have been kept open by detours while they were flooded and prompt rehabilitation has enabled operation over the inundated tracks practically as soon as the water receded, while on the systems which have been hardest hit, the major portions of their lines and most of their through routes have been entirely unaffected.

For example, New Orleans has been the center of much publicity and alarming reports concerning railways in the vicinity of that city have been appearing almost daily. Actually, New Orleans has not been and is not now suffering from traffic interruptions. Service to the East and North is entirely unaffected and despite the fact that all but one main line to the West are under water, detours via the open line are being made successfully by the trains of the railways that are flooded and the service to the West is unhampered, except to some local points immediately affected by the high water.

There is no denying the fact that the present deluge is appalling in magnitude and takes its place among the major disasters of the nation's history. It has cost the railways enormous sums and will continue to do so for some time to come, until the last of the flood waters flow harmlessly into the Gulf of Mexico. In all, some 18,000 square miles were overflowed, a sufficiently awe-inspiring area. Relatively, however, this is a small portion of the country. If it were confined to one single area, it would form a lake 600 miles long and 300 miles wide, about the same as Lakes Michigan and Huron. However, a glance at the map of the United States will convince anyone that even this huge area is relatively insignificant, as compared to the whole United States.

The railways are making a praiseworthy and successful fight to preserve normal service. It is only fair, under the circumstances, that shippers should aid them by adhering to normal routing.

## Labor Leaders on Farm Conditions

WHAT do the leaders of the railway labor unions really believe has been and is the condition of agriculture and the effect of freight rates upon it? This question is raised by the wide inconsistency between the policy of most of them in supporting the most radical public men in western farming states, and what the leaders of the conductors' and trainmen's brotherhoods have said about farm conditions and freight rates in the recent hearings before an arbitration board in Chicago.

Senator Smith W. Brookhart of Iowa continues to proclaim that organized labor and the farmers must combine to promote their common interests. His speeches echo those made prior to 1924, and especially in that year, by the late Senator LaFollette and radical public men who, in supporting Mr. LaFollette's candidacy for the presidency, tried to effect a lasting combination of the farmer and labor vote. The heads of almost all the railway labor unions previously to 1924, in that year, and subsequently, have joined with western radical politicians in saying the condition of the farmer is very bad; that this is largely due to excessive freight rates on his products, and that to give him relief these rates should be reduced.

As recently as in the election last fall the radical leaders of organized labor and the radical politicians in the west worked together. The official monthly magazine of the Brotherhood of Locomotive Firemen and Enginemen, in its issue for December, 1926, commented upon the results as follows: "The non-partisan political policy of our brotherhood and of organized labor generally bore splendid fruit in the November election. As a result, Progressives will have the satisfaction next March of seeing a United States Senate seated in which Senator Norris, Frazier, LaFollette, Brookhart, Nye and their colleagues will hold the balance of power, because neither the regular Republicans nor the Democrats will have a majority." All the senators whose names were mentioned are from agricultural states—Norris being from Nebraska; Frazier and Nye from North Dakota; LaFollette from Wisconsin, and Brookhart from Iowa.

### *Farmers Getting Along Fairly Well*

Now listen to what some labor leaders recently have been saying to the arbitration board in Chicago about the condition of the farmer. One of them is L. E. Sheppard, president of the Order of Railroad Conductors, who represented the railway labor unions at the headquarters of the LaFollette-Wheeler party in 1924. The western railways showed this arbitration board that they have been unable, ever since the Transportation Act went into effect, to earn anywhere near what the Interstate Commerce Commission has held would be a fair return; that this has been mainly due to the fact that the commission has reduced and held down their rates upon the ground that western agriculture has been in a condition of depression; and that the railways could not afford to pay higher wages unless granted a general advance in their freight rates, including those on farm products. The presidents of western railways were formally warned by the American Farm Bureau Federation that it would strongly oppose an advance in rates to enable them to pay higher wages. On the last day of the hearings Mr. Sheppard, who lives at Cedar Rapids, Iowa, made the following statements regarding farm conditions in western territory:



"Referring to the four and a half million of farmers and the statement that their income has been reduced, my observations of the farmers during the war, especially out in Iowa, were that they went out and tried to buy all of the land that they could get their hands on, at fabulous prices, and some of them did not unload and cannot unload without serious loss. I find, however, that the average farmer who owns his farm and who is content with being a farmer and to do some little like his forebears did on the farm is getting along fairly well.

"I have heard a story regarding the attitude of the farmers and their condition. It may be a little far-fetched, but when I walk around the town in which I live on a Saturday afternoon or most any evening, and when I want to park my automobile in front of my own building, I usually find some farmer's automobile there, and he and his wife are generally in the picture show or around the corner talking to some neighbor. It was said this conversation was overheard: One farmer said to the other: 'John, what are you doing in town with the Ford?' The reply was: 'My wife had the Cadillac and my daughter had the Buick, so I had to use the Ford.'"

### *Living in Comfort and Ease*

Unlike other railway labor organizations, the Brotherhood of Railroad Trainmen has not participated in efforts to form a political combination of organized labor and the farmers. Nevertheless, some views expressed by A. F. Whitney, vice-president of the Brotherhood of Railroad Trainmen, in the arbitration hearings mentioned are interesting.

"I firmly believe," said Mr. Whitney, "that the farmer has progressed more rapidly than the railroad man or any other man who works for a daily or monthly wage. According to an investigation I have recently made, approximately 97 per cent of the Nebraska farmers own automobiles and 89 per cent own telephones, and what is true in this respect in Nebraska is very largely true in Iowa, Minnesota and other granger states. Their homes are equipped with bathrooms, electric lights and other modern conveniences, very largely, to the same extent as the better classes in the cities.

"It is a matter of common knowledge that hundreds of farmers are retiring annually and moving to the towns and cities to live in comfort and ease. The Squire Realty Company of Aberdeen, S. D., has wired me that there are from two to three hundred retired farmers living in Aberdeen, a city of about ten thousand inhabitants. The Chamber of Commerce of Long Beach, Cal., advised me that they estimate between five and ten thousand retired farmers are living in that city. There are many retired farmers living in Los Angeles; as a matter of fact, there are so many Iowa people residing in that city that they have organized an Iowa society. That indicates that the Iowa farmer is prosperous, otherwise he could not retire and go to Long Beach or Los Angeles to live.

"The transportation cost is but one of the minor elements that enter into the farming situation. For instance, I shipped a carload of sheep from Warwick, N. D., to Thief River Falls, Minn., a distance of 185 miles, and the freight on these sheep amounted to only 47 cents a head, which was practically nothing when compared with the value of the sheep. If an increase in freight rates were necessary to enable the railroads to absorb any increase in wages, that would not be any real burden to the farmer."

### *What Will the Farmer Say?*

Not in six years has anybody else painted such a glowing picture of farm prosperity in the west as was painted by Messrs. Sheppard and Whitney in the statements quoted. An interesting question is as to what western farmers will say concerning the views expressed by these labor leaders. We fear that if they are widely disseminated, western radical statesmen will find it more difficult in future to get western farmers and organized labor to co-operate in the cause of both reducing railway rates and increasing railway wages as a means of destroying the earning capacity of the railways and promoting government ownership.

## President Green and Editor Coyle

COMMENT has appeared in these columns from time to time on the socialistic tone of the editorials and other contents of the "Locomotive Engineers Journal," the official organ of the Brotherhood of Locomotive Engineers. This brotherhood is composed of the highest paid employees of the railways, but the organ of their union has been more unfair in its attacks on private management, and more disposed to try to create sentiment among working men in favor of government ownership of railways and other industries, than any other organ of the labor unions, excepting perhaps "Labor," that has come to our desk.

It appears that Albert F. Coyle, editor of the Locomotive Engineers Journal, is regarded as too radical by William Green, president of the American Federation of Labor.

Mr. Coyle and others have been formulating plans to organize a "labor delegation" to visit Russia and other countries in Europe. Mr. Green has issued a statement in which he says: "For the purpose of relieving any wrong public impression which may prevail the officers of the American Federation of Labor wish it to be understood that this delegation which is being organized, and of which Mr. Coyle is a member, is not clothed with authority to speak for the American Federation of Labor. \* \* \* It will be the purpose of the American Federation of Labor to notify the officially organized labor organizations in the European countries, in case Mr. Coyle and his associates consummate their plans to visit Russia, that they cannot be regarded as a labor delegation in the true sense of the word, clothed with authority to speak for American labor and for the American Federation of Labor."

The Brotherhood of Locomotive Engineers is not affiliated with the American Federation of Labor, but it is evident this is not the significant reason for Mr. Green's repudiation of the proposed "labor delegation," but that it is to be found in his repeated and particular references to the plan to visit Russia. The American Federation of Labor has heretofore emphasized its disapproval of the Bolshevik form of communism and all its works. The members of the Brotherhood of Locomotive Engineers can hardly fail to do some serious thinking about this repudiation by the American Federation of Labor of the activities of the editor of their official organ. Apparently Mr. Green and his associates would not dissent from certain views that have been expressed in the *Railway Age* regarding the character of some of the socialistic propaganda that has been officially disseminated among employees of the railways of the United States.



## Soixante Ans de Coopération Internationale

**L**E CANADA, nation unifiée, célébrera bientôt son soixantième anniversaire de naissance. Le congrès de la Section de la Mécanique de l'American Railway Association qui se tiendra à Montréal la semaine prochaine marquera la soixantième année de coopération amicale entre les hauts fonctionnaires des services de la mécanique des chemins de fer américains et canadiens pour la solution de leurs problèmes communs. En d'autres termes le contact étroit qui existe entre les hommes de chemins de fer canadiens et leurs collègues au sud de la frontière internationale est aussi vieux que le Dominion lui-même.

Il serait difficile de trouver ailleurs, dans le monde, deux nations voisines vivant en termes aussi cordiaux que le Canada et les Etats-Unis. Les citoyens des deux pays vont les uns aux autres, par affaires ou socialement, sans avoir l'impression de visiter une terre étrangère.

Dans ces relations internationales l'on ne saurait trouver meilleure preuve de coopération que dans la façon dont les chemins de fer s'entraident. Les réseaux américains traversent des parties du territoire canadien pour atteindre d'autres régions des Etats-Unis; les lignes canadiennes empruntent le territoire américain pour rejoindre certaines régions du Canada. Des deux cotés de la frontière les wagons s'échangent librement.

D'où vient cet état de choses? Des réunions d'hommes de chemins de fer comme celle qui prendra place à Montréal la semaine prochaine.

Lorsque les chemins de fer firent leur apparition sur ce continent chaque ligne avait ses types de voies et de matériel. Trains et wagons ne pouvaient pas, comme aujourd'hui, aller de l'une à l'autre. C'est pour atteindre ce dernier résultat que furent formées les diverses associations ferroviaires.

Ces associations, après échange amical d'idées et d'opinions, agissent chacune de leur côté et, sans y être forcées aucunement, firent subir à leurs réseaux les changements nécessaires. Ils firent aussi accepter des plans types facilitant l'échange des wagons et des marchandises. Les représentants des réseaux canadiens joignirent leurs efforts à ceux de leurs collègues américains dans un esprit d'entière coopération.

Rien n'engendre mieux la méfiance et la mauvaise volonté que l'ignorance. Il est indubitable que le peuple canadien et le peuple américain se connaissent mieux que peuvent le faire les citoyens de deux autres nations. Cette connaissance est le résultat des facilités de transport qui existent entre les deux pays.

Nous pouvons donc dire que la coopération des hommes de chemin de fer canadiens et américains, commencée l'année même où le Dominion naquit, a contribué puissamment à l'amitié canado-américaine. Lorsque les hauts fonctionnaires des services de la mécanique des chemins de fer se rencontrent pour discuter des plans de locomotives et de wagons, l'échange du matériel et autres problèmes techniques, ils forment encore une sorte de groupe d'hommes d'Etats assemblés dans le but de promouvoir une coopération et une amitié internationales.

Nous disions qu'il n'y avait pas de nations voisines possédant des chemins de fer qui, comme les Etats-Unis et le Canada, travaillaient si bien ensemble à encourager les communications internationales. Nous pourrions ajouter qu'il se trouve des états, relevant d'un même gouvernement central, où les communications ne sont pas si faciles; en Australie par exemple. Dans ce pays les états vivent en bons termes, mais les chemins de fer

n'ont malheureusement pas, dès les débuts, coopéré comme l'ont fait ceux du Canada et des Etats-Unis; conséquemment l'écartement de leurs voies varie dans les divers états. Résultat: il est plus facile de traverser sur ce continent une frontière internationale qu'en certaines parties de l'Australie une frontière d'état.

Non seulement les chemins de fer canadiens et américains ont échangé librement des idées, des plans types et du matériel, mais aussi du personnel. Nombre d'hommes qui se sont élevés à des postes importants dans les chemins de fer américains sont nés au Canada alors que nombre d'autres, bien connus au Canada, sont d'origine américaine.

Au point de vue ferroviaire le Canada est privilégié. Ses lignes le desservent efficacement et ses tarifs sont bas si nous les comparons à ceux exigés dans d'autres parties du monde pour un service très inférieur. De plus il a presque la moitié plus de milles de voie, par 1,000 habitants, que tout autre pays, l'Australasie exceptée. Si nous tenons compte de ce fait et des tarifs raisonnables, il est aussitôt évident que les chemins de fer canadiens peuvent suffire aux besoins de transport d'une population beaucoup plus dense.

Le Canada ne pourrait probablement pas exister sous sa forme actuelle de nation unie sans chemins de fer pour relier entre elles ses diverses provinces. On pourrait dire la même chose des Etats-Unis. Les chemins de fer ont donc rendu les pays possibles; ils favorisent aussi leur agrandissement et leur progrès. De vastes contrées du Canada, riches en ressources naturelles, facilement accessibles aux travailleurs du sol, sont maintenant ouvertes à la colonisation. De bons colons, aidés, par les chemins de fer, viennent y travailler à leur fortune et, incidemment, à celle du Canada.

L'avenir du Canada, de même que son passé, reposent sur ses réseaux ferroviaires, raison de richesse et d'une population plus dense, condition sine qua non de prospérité. Notre intention n'est pas de comparer les relations de chemins de fer canadiens à américaines et celles de chemins de fer d'autres nations voisines; nous croyons toutefois avoir atteint un résultat de bénéfice mutuel et s'il se trouve chez nous quelque chose pouvant servir à d'autres pays nous ne voulons pas la cacher.

On a dit du Canada qu'il était un interprète entre le Vieux Monde et le Nouveau, les Canadiens-Français ayant des relations avec l'Europe continentale particulièrement et les Canadiens de langue anglaise avec la Grande-Bretagne. Mais dans le domaine de l'entente cordiale son rôle est encore plus important; il est lui-même un exemple de tolérance entre races et de coopération entre groupes, de langues différentes, mais travaillant de concert, dans un esprit de loyauté civique, à la puissance et à la grandeur du pays. Ici encore les chemins de fer, avec leurs armées d'employés dévoués, les uns parlant français, les autres anglais, tous se prêtant une aide mutuelle et amicale, témoignent du magnifique esprit qui règne dans la nation et général.

Dans ce numéro du *Railway Age* nous offrons à nos lecteurs plusieurs articles traitant des hauts faits des chemins de fer canadiens, dans le domaine de la mécanique spécialement. Le prochain congrès de la section de la mécanique en est la raison. Mais ce numéro étant imprimé en anglais notre exposé de la situation ne serait pas complet si nous omettions de reconnaître ici la part prise par les hommes de chemins de fer canadiens-français dans tout ce qui a été fait par les réseaux canadiens-Honneur à vous hommes de chemins de fer canadiens-français! Et que les heureux soixante ans de coopération avec nous ne soient que le commencement d'une longue ère de relations cordiales entre les chemins de fer canadiens et américains.



Southbound Train on Track No. 2—Note Northbound "Entrance" Signal for Track No. 5 at Left

## Either-Direction Signals Relieve Serious Terminal Congestion

*Improved operation secured on joint line of N. Y. C. and C. R. I. & P. in Chicago*

By Leroy Wyant

Signal Engineer, Chicago, Rock Island & Pacific

**T**HE Chicago, Rock Island & Pacific and the New York Central have recently placed in service a rearrangement of track facilities and signaling on the four- and six-track line which they operate jointly from Englewood (63rd street) to the La Salle Street station, Chicago. Heretofore the passenger traffic has been concentrated on the two center tracks and the new facilities have relieved the serious passenger train congestion in this territory.

In addition to all New York Central and Rock Island passenger trains those of the Nickel Plate also use these tracks. The coach yards of the Rock Island are located on the west side of the main line between 51st and 53rd streets and the New York Central coach yards on the east side between 40th and 44th streets, which locations require extra movements of equipment over the main line between the La Salle Street station and these yards.

The following data indicate the volume of traffic in this territory:

|                               |     |
|-------------------------------|-----|
| 24-hour check:                |     |
| Through passenger trains..... | 76  |
| Suburban trains .....         | 135 |
| Coaches .....                 | 53  |
| Light engines .....           | 153 |
| Freight trains .....          | 68  |
|                               | 485 |
| Peak movement, one direction: |     |
| 5:00 p. m. to 6:30 p. m.—     |     |
| Through passenger trains..... | 5   |
| Suburban trains .....         | 20  |
| Coaches .....                 | 2   |
| Light engines .....           | 7   |
| Freight trains .....          | 7   |
|                               | 41  |

With only the double-track line for passenger train operation, any delay for crossover movements at the coach yards, at the Englewood or La Salle stations or at

the several railroad crossings in this territory resulted in delays to several following trains. Estimates showed that a very large expenditure would be required for two additional tracks from 39th street to the station and the rearrangement of yards. As the entire terminal situation is unsettled, principally on account of a river



Looking North Toward the 61st Street Junction—C. R. I. & P. Tracks at Left and N. Y. C. Tracks at Right

straightening project; it was not considered that such an expenditure was justified at this time.

However, since any proposed scheme embraced the use of four tracks as running tracks for passenger trains, it was decided to go ahead at once and use the present four tracks for both passenger and freight trains, arranging for switching movements to be made at periods during the day that did not conflict with the maximum passenger train rush. As the preponderance of traffic is inbound

during the morning and outbound at other periods it was decided to equip the two outside tracks, No. 2 and No. 5, (tracks No. 3 and 4 were the existing passenger mains) with automatic signals to direct train movements in either direction. The result of this arrangement is that, if desired, as many as three tracks can be used at one time for movements inbound or outbound.

The two tracks, No. 2 and No. 5, were relaid with new rails and rebalasted, and the bridges were strengthened to conform with high-speed running track standards. As the semaphore signals on the two center tracks, No. 3 and No. 4, had been previously replaced with light signals, it was decided to provide the either-direction signals of the same type for tracks No. 2 and No. 5.

#### Terminal Divided Into Zones

All train movements in this territory are directed by signal indication without written train orders. Therefore, special control methods were required to establish the traffic direction on tracks No. 2 and No. 5 for either-direction operation. The location of the interlocking plants and switchmen's houses at busy main-line cross-overs naturally fixed the limits of the intervening automatic-signal zones, as shown on the diagram. Zone No. 1 extends from the La Salle Street station interlocking at Harrison street to the interlocking at the 16th street crossing of the Illinois Central, while zone No. 2 extends from the 16th street interlocking to the 25th street cross-overs. Zone No. 3 extends from 25th street to 40th street where the crossovers and turnouts entering the north end of the N. Y. C. coach yard are located, and the next zone, No. 4, includes the territory from 40th street to the interlocking at 45th street, which handles the switches and crossovers for the leads to the stock-yard and for the south end of the N. Y. C. coach yard. Zone No. 5 extends from this interlocking to the interlocking at 61st street, which handles the various switches and crossovers where the joint track operation ends.

The Rock Island has three running tracks from the 61st street interlocking to the Gresham (89th street) interlocking. The third track of this layout being a continuation of track No. 5. This track was rebuilt and signaled for either direction operation at the same time as the improvements were made north of Englewood. This change, which gave the Rock Island an express track from Gresham to the "loop," has been of great benefit in permitting the successful operation of suburban express trains on the Rock Island over track No. 5, thus leaving the double track for the through and local trains.

#### Methods of Directional Control

Having established the limits of the zones, it was decided to use modified absolute permissive single-track block signaling for tracks No. 2 and No. 5, to permit either-direction operation from Englewood to the La Salle street station. The telephones in the towers and switch tenders' houses were equipped with loud speakers and telephone sets were installed at all important cross-overs and switches. With this arrangement, whenever a towerman, switch tender or trainman talks to a similar employee at another tower or station everyone along the line involved in the handling of trains hears the conversation and immediately plans the movements under his control to conform with the move discussed over the telephone. In case the proposed movement interferes with those already started at any point, the operator at such a point immediately discusses the situation with the other employees concerned and a movement best suited to conditions is agreed upon.

The line-up of the entering signal indications estab-



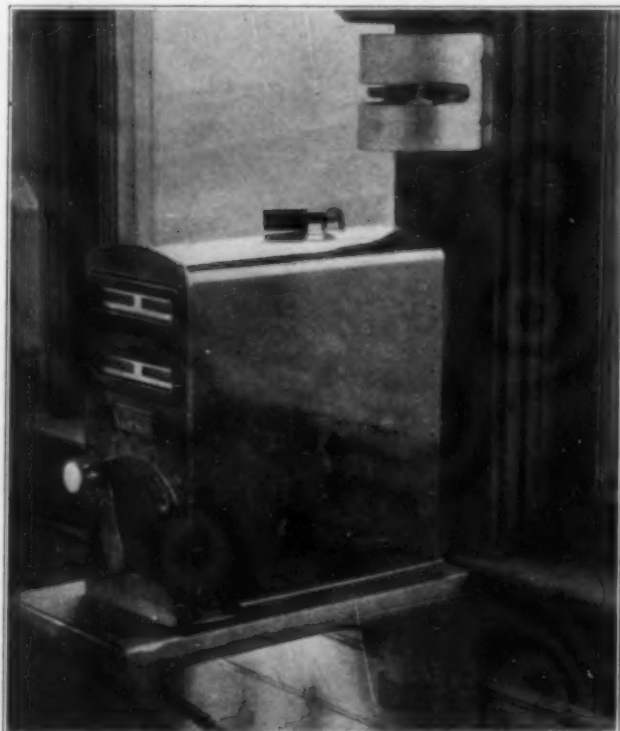


lishes the direction in which traffic is to move. The control circuits for the signals in one direction in a zone are carried through lever circuit controllers in the towers or switch tenders' houses at each end of the zone. The actual clearing of the entering signal likewise is controlled by the lever controllers at either end of the zone and the arrangement is such that the two levermen must co-operate in order to clear an entrance signal.

The entering signal is distinguished from regular automatic signals by a second light signal unit and by the absence of a number plate. In case an engineman is stopped at an entering signal indicating stop he must stay until authorized to proceed, either by the signal being cleared or by a telephone clearance from the leverman, telephones connected to the loud-speaker system being located at all entering signals. In case of a failure of communication the train may proceed when preceded by a flagman to the next point of communication. In other words, the requirements are the same as for a train leaving a station on single track. Having once established the direction of operation, following movements can be made without action on the part of the leverman. When a leading train clears the first block, the entering signal operates to the caution indication, thus permitting a following train to enter the block.

#### Rules Governing Special Operation

Changing track No. 5 from a freight and switching track to a passenger track required a definite rule concerning movements from and to this track and switching



Desk Lever in Englewood Tower for Traffic Locking on Track No. 5 South to Gresham

or industrial track connections. However, the conditions were identical with any main line single track and, therefore, the regular rule, as follows, applies:

No switches leading to or from track No. 5 shall be opened without permission of parties controlling the block occupied or to be occupied. No movement shall be made in the reverse direction to that authorized by entrance signal or parties controlling the block, without further permission.

On the section from Englewood to Gresham the Rock Island decided to use the more common method of traffic locking to control the direction of traffic. With this method only the opposing entrance signals are check locked. The intermediate signals operate as ordinary double-track automatic-block signals. Both of the methods of directional control are working satisfactorily, each having certain advantages and disadvantages.

A separate loud-speaker telephone system is in service from Englewood tower, south, including the Gresham tower. These two levermen discuss the movements of



Looking North Toward Tower at 61st Street—Note Either-Direction Interlocking Signals for Track No. 5

trains due. For example, if no train is occupying track No. 5 between these points and the route is to be lined up for a southbound train; the Gresham leverman moves the handle of his desk lever to the "release" position, which unlocks the lever at Englewood providing all intermediate blocks are clear, permitting the leverman at that point to move his lever to the right, which changes the southbound entering signal to the proceed indication. No action is necessary for following train movements but if traffic is to be reversed the track must be clear and both levermen co-operate to change the line-up. As long as the track is occupied traffic direction cannot be changed but the entering signal, if at proceed, can be changed to stop.

#### Special Conditions Handled Satisfactorily

Before placing the new signaling in service a careful analysis was made of the unusual conditions to be met in single-track operation without train orders in a congested terminal zone. The use of additional employees as train directors was considered. However, it was finally decided to try the system with a limited number of trains using track No. 5 without train directors, but the trains using track No. 5 were scheduled in the time card as doing so. As anticipated at that time, conditions varied too rapidly during the rush hours to permit scheduling the trains on certain tracks. Therefore, within a few months after the system was placed in service, it was decided to eliminate all scheduling of trains on these additional tracks, leaving towermen under the frequent supervision of operating officers. So far as the Rock Island is concerned, it has been practically concluded that

train directors are not necessary, thus requiring no additional operating help and the only additional maintenance help was one signal maintainer through the entire zone.

### Operating Results Satisfactory

A concrete example of the flexibility of train operation can be cited for a recent morning when three northbound trains between Gresham and La Salle street station were operated as follows: A local suburban train started out of Gresham on track No. 3, making stops at the three suburban stations between that point and Englewood. A through passenger train, which would normally run on track No. 3 was routed over track No. 5, on which it was able to overtake and pass the local before it had reached Englewood. While the through train was standing at Englewood to discharge passengers



Interior of Tower at 45th Street Interlocking Showing Special Switches on Wall for Controlling Either-Direction Signaling

and baggage, an express suburban train, following on track No. 5, approached the Englewood plant and was routed over on track No. 6 to pass around the through train standing at the Englewood station without stopping, and then ran on to the La Salle street station on track No. 3. The through train finished its station work and followed the express, and in due time the local came along. Thus the order of the three trains was just reversed and all were kept moving without delays, arriving at the main station on time.

An early objection to the proposed method of operation was that late stock trains would be held out of the terminal on penalty time. However, it has been found that by regulating the number of cars, stock or other freight trains can be run in between passenger trains during the morning rush, without serious inconvenience. The tracks leading to the stock yard turn off to the west at 40th street and the connection to the N. Y. C. coach yard to the east. These switches and main-line cross-overs are handled by switch tenders in service for the 24-hour period.

### Other Similar Installations Planned

As a result of this new method of operation, terminal congestion in the station has been relieved and train delays between Englewood and the La Salle station have been decidedly reduced. The use of this either-direction signaling system on track No. 5, for example, has proved so satisfactory that the Rock Island is now installing a similar arrangement on the westbound track of the double-track line from Joliet, Ill., to Blue Island, a distance of 24 miles, so that the preponderance of eastbound

traffic in the morning can be handled over both tracks. The same system is to be used also on the eastbound track of a 10-mile section of double track on the Kansas division, so that passenger trains can run around freight trains on a long hill. Train movements will be directed by signal indication without train orders on both installations.

## Freight Car Loading

WASHINGTON, D. C.

REVENUE freight car loading in the week ended May 21 amounted to 1,016,803 cars, a decrease of 22,267 cars as compared with the corresponding week of last year and an increase of 29,497 cars as compared with 1925. Livestock loading showed an increase of 1,490 cars as compared with last year but all other commodity classifications showed slight decreases, coal showing a falling off of 3,630 cars, forest products a decrease of 4,924 cars, and miscellaneous freight a decrease of 7,637 cars. Increases were reported, however, as compared with last year's figures, from the Pocahontas, Southern and Northwestern districts, while the other districts showed reductions. The summary, as compiled by the Car Service Division of the American Railway Association, follows:

### Revenue Freight Car Loading

Week Ended Saturday, May 21, 1927

| Districts                  | 1927       | 1926       | 1925       |
|----------------------------|------------|------------|------------|
| Eastern                    | 243,034    | 250,234    | 236,707    |
| Allegheny                  | 209,122    | 211,941    | 201,790    |
| Pocahontas                 | 60,960     | 57,055     | 50,026     |
| Southern                   | 153,161    | 148,697    | 142,717    |
| Northwestern               | 156,970    | 158,099    | 154,703    |
| Central Western            | 123,021    | 138,864    | 128,057    |
| Southwestern               | 70,535     | 74,180     | 73,306     |
| Total Western Districts    | 350,526    | 371,143    | 356,066    |
| Total All Roads            | 1,016,803  | 1,039,070  | 987,306    |
| Commodities                |            |            |            |
| Grain and Grain Products   | 38,266     | 39,633     | 38,796     |
| Live Stock                 | 28,376     | 26,886     | 26,684     |
| Coal                       | 161,588    | 165,218    | 152,580    |
| Coke                       | 10,540     | 11,868     | 9,423      |
| Forest Products            | 72,206     | 77,130     | 75,704     |
| Ore                        | 61,495     | 62,121     | 62,729     |
| Mdse., L. C. L.            | 261,500    | 265,745    | 258,514    |
| Miscellaneous              | 382,832    | 390,469    | 362,876    |
| May 21                     | 1,016,803  | 1,039,070  | 987,306    |
| May 14                     | 1,029,126  | 1,029,748  | 985,879    |
| May 7                      | 1,024,416  | 996,216    | 983,034    |
| April 30                   | 1,026,440  | 995,408    | 984,073    |
| April 23                   | 955,215    | 973,158    | 961,186    |
| Cumulative total, 21 weeks | 20,326,169 | 19,839,025 | 19,449,531 |

### Car Loading in Canada

Revenue car loadings at stations in Canada for the week ended May 21 totaled 61,536 cars, a decrease from the previous week's loadings of 514 cars, and a decrease from the loadings for the same week last year of 2,163 cars.

| COMMODITIES                          | Total for Canada |              |              | Cumulative Totals to Date |           |
|--------------------------------------|------------------|--------------|--------------|---------------------------|-----------|
|                                      | May 21, 1927     | May 14, 1927 | May 22, 1926 | 1927                      | 1926      |
| Grain and Grain Products             | 6,781            | 7,664        | 10,343       | 157,175                   | 140,490   |
| Live Stock                           | 1,826            | 1,857        | 1,857        | 40,226                    | 40,746    |
| Coal                                 | 6,135            | 6,097        | 5,169        | 125,042                   | 88,880    |
| Coke                                 | 311              | 319          | 387          | 6,943                     | 8,852     |
| Lumber                               | 4,183            | 4,212        | 3,924        | 67,702                    | 67,791    |
| Pulpwood                             | 1,825            | 1,674        | 1,961        | 87,276                    | 65,759    |
| Pulp and Paper                       | 2,237            | 2,145        | 2,448        | 44,511                    | 51,466    |
| Other Forest Products                | 3,026            | 3,012        | 2,750        | 64,902                    | 68,699    |
| Ore                                  | 1,528            | 1,793        | 1,818        | 28,999                    | 29,503    |
| Merchandise, L. C. L.                | 17,801           | 17,894       | 16,819       | 334,076                   | 312,641   |
| Miscellaneous                        | 15,883           | 15,383       | 16,223       | 254,239                   | 244,632   |
| Total Cars Loaded                    | 61,536           | 62,050       | 63,699       | 1,211,091                 | 1,119,459 |
| Total Cars Received from Connections | 38,882           | 39,251       | 38,304       | 784,459                   | 750,571   |



*Lackawanna's Four Track Main Line Through the Industrial Section of Passaic, N. J.*

## D. L. & W. Adds to Freight Traffic Facilities in New Jersey

*New double track freight line and additional third and fourth tracks ease operating conditions*

By W. H. Speirs

Assistant Engineer, Delaware, Lackawanna & Western, Hoboken, N. J.

**I**N order to permit the economical and expeditious handling of the constantly increasing freight traffic on its lines in eastern New Jersey the Lackawanna has built a double track freight line approximately seven miles long from Kingsland, on the Boonton line, to Harrison, where the freight terminal yard for the Morristown line is located, and has also installed an additional section of third and fourth main tracks on the Boonton line for a distance of about five miles.

The Lackawanna's main line west from the Hoboken terminal consists of four main tracks to Bergen Junction, a distance of two miles, from which point two main lines, each about 34 miles long, extend by different routes to a

junction at Denville, N. J. What is known as the Boonton line extends northwesterly from Bergen Junction through Passaic to Patterson and thence westerly through Boonton, while the Morristown line has a southwesterly trend from Bergen Junction through Newark, the Oranges and Milburn to Summit, whence it extends northwesterly to Denville. The Boonton line is used primarily for freight traffic, although some through passenger trains are routed over it. The Morristown line, on the other hand, carries a heavy suburban service and for that reason is not well adapted for freight service.

Prior to the beginning of this work the Boonton line



*The Old and New Undercrossings at Main Avenue, Passaic, N. J.*



consisted of double track except for a stretch of four-track line from Pequannock river, near Lincoln Park, to Boonton, a distance of about seven miles. The Morristown line has three main tracks from Bergen Junction to Milburn, a distance of about 15 miles, except for a double track bridge across the Hackensack river between Bergen Junction and Harrison, and is double track be-



D. L. & W. Lines in Eastern New Jersey

tween Milburn and Denville. Since the tide of the suburban traffic is eastward during the morning hours and westward in the late afternoon the middle track on the three-track line is used as an eastbound or westbound track according to the demands of traffic, thus securing many of the practical advantages of a four-track line.

#### New Connecting Line Eliminates Back Haul

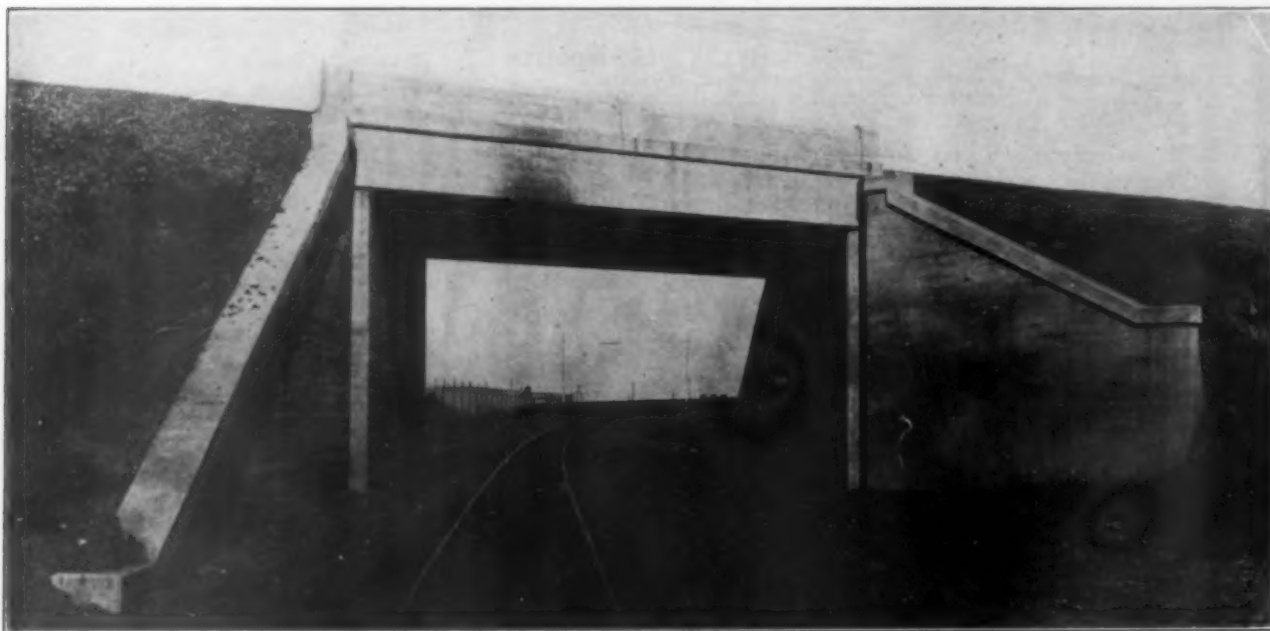
The building of the line between Kingsland and Harrison yard eliminates about  $6\frac{1}{2}$  miles of back haul on all

quently occurred at Bergen Junction, located at the west end of the twin double track tunnels through the Bergen hills.

Harrison yard lies almost directly south of Kingsland, both being on the westerly edge of the Hackensack meadows. A line drawn between them follows closely the western edge of the meadows and the eastern limit of the higher ground on which are located the towns of Kearney, Arlington and North Arlington. These towns are adjacent to and east of North Newark and its suburbs to the north.

While the construction of the new line was prompted primarily by the desirability of direct connection between the Boonton line and Harrison yard, two other factors had a bearing on the adoption of the plan. The first of these is the fact that along the location chosen there is a large amount of vacant land, both upland and meadow, suitable for industrial development, since it is intersected by important highways and can be served by industrial tracks from the new line. With the important towns and cities nearby to the west and the large area of undeveloped meadow land to the east, extending about  $1\frac{1}{2}$  miles to the Hackensack river, it seems logical that industrial development will follow, since there is little land available for additional sites east of Hackensack river. Another factor favoring the construction of the line is the ease with which trains may be detoured from one line to the other in case of the disablement of either of the two bridges over the Hackensack river; one on the Boonton line and the other on the Morristown line.

The grading for the new line was almost entirely in embankment and required approximately 1,000,000 cu. yd. The material was secured for the most part from one main borrow pit and several smaller pits located on the adjacent upland at convenient points along the line.



Concrete Slabs 36 ft. Long Were Used to Carry the Greenwood Lake Branch of the Erie Over the New Line

freight moving between the west and Harrison yard. Before this line was built such traffic moved from Harrison yard to Bergen Junction, a distance of about 6 miles, and thence west through Kingsland, which is approximately  $7\frac{1}{2}$  miles west of Bergen Junction. In addition to the extra haul involved in this movement considerable delay was entailed by the density of the suburban traffic on the Morristown line and the congestion which fre-

The material from the main borrow pit was entirely rock and was handled by narrow gage equipment, while the material from the smaller pits was hauled by motor trucks.

The new line crosses three important highways and two branches of the Erie, and a profile was adopted to provide for the separation of grades at these points. Going north from Harrison the new line crosses over Har-

rison Avenue, commonly known as the Jersey City-Newark turnpike, the Newark Branch of the Erie and Bergen avenue and under the Greenwood branch of the Erie, all in the town of Kearney. Continuing northward the line crosses over Belleville avenue, the turnpike between Jersey City and North Newark, beyond which the grade follows closely that of the meadows to the northerly end of the line at Kingsland. A vehicle subway was provided as an entrance to a sewage disposal plant located on the meadows east of the new line and a number of sewers, drains and creeks were crossed, necessitating five reinforced concrete box culverts, thirty-one 36-in. pipe culverts and two 30-in. pipe culverts.

The bridge and culvert construction is of modern design. The bridges over Harrison, Bergen and Belleville avenues are double track, through plate girder structures with solid floors, the membrane waterproofing on the floors being protected by asphalt blocks. The Harrison Avenue bridge provides a clear highway opening of 86 ft. 6 in. and the girders are 90 ft. 6 in. between bearings, spaced 17 ft. 6 in., center to center; the Bergen Avenue bridge spans a street 60 ft. wide, the girders being 83 ft. 6 in., center to center of bearings and spaced 19 ft. center to center; while the bridge at Belleville avenue provides a highway width of 80 ft. with girders 85 ft. 1½ in. between bearings and spaced 18 ft. 6 in. center to center.

The bridge over the Newark branch of the Erie has a clear opening of about 76 ft., with 22 ft. vertical clearance. The girders are spaced 11 ft. 6 in. center to center and the floor is of the standard open design. The bridge to carry the main tracks of the Greenwood branch of the Erie was built with precast slabs to avoid detouring traffic on that road during construction. The crossing is on a skew and the slabs, which give a clear span of 36



The New Kingsland to Harrison Line, Looking South from the Main Borrow Pit

ft., are 41 ft. 8½ in. long, over all, a somewhat longer span than for any pre-cast slabs previously used on the Lackawanna.

The grading and masonry were done by contract and required about a year for completion. The bridge erection and tracklaying were done by company forces. The line was completed and placed in service within 15 months after the beginning of the work.

Until recently the facilities on the Boonton line were sufficient for handling the traffic efficiently, but the rapid industrial development of this section has so increased the business of the road that additional main trackage

became necessary. In carrying out this work it has been the policy to eliminate grade crossings either by the depression of the highways or by their relocation where it can be done conveniently to eliminate the crossings entirely.

The section of third and fourth tracks completed recently extends from the Passaic river at Lynhurst to Paterson Junction, located about one mile east of Paterson, a distance of about five miles. This part of the line



New Station at Clifton, N. J.

is located through the outlying portions of the cities of Clifton, Passaic and Paterson, and in addition to the grading and tracklaying, involved the elimination of two highway grade crossings at Clifton by the depression of the roadways, as well as the reconstruction of one railroad undercrossing bridge and the improvement of the passenger station facilities at that point. At Passaic the improvements consisted of the construction of two bridges for highway undercrossings, the reconstruction of bridges at two highway undercrossings, the reconstruction of an interlocking plant and the construction of an entire new local freight layout, as the business had outgrown the old facilities. The west end of the new work is at Paterson Junction, where the Paterson branch joins the Boonton line, and the old interlocking plant at that point was rebuilt.

The character of construction was of advanced type, the heavier weights of rail up to 130 lb., creosoted ties, tie plates and screw spikes being used for the tracks, while the bridges over the highways are of reinforced concrete slabs, which permit the regular track construction, including ballast, to be carried over them and present no obstructions to limit clearances or interfere with maintenance work. Two of the bridges at Passaic, on account of the small depth available for the thickness of the floors, were constructed with the mushroom type of reinforcing for the slabs, with circular concrete columns for supports at the curb lines and the centers of the streets. This type of construction also provides a much less obstructed view for the street traffic than the ordinary concrete slab bridge with pier supports. An example of this type of construction is seen at Main street in Passaic, where a marked improvement was made in the conditions affecting highway traffic.

The two stretches of four-track line already constructed on the Boonton line form parts of a 40-mile section of road between the main easterly freight terminal at Secaucus, approximately five miles west of Hoboken Terminal, and the intermediate freight terminal at Port Morris, N. J. From the nature of the traffic this will be the first extensive section of the Lackawanna to be provided with four main tracks and the present volume of business requires that this be done in the near future, with the indication of the further extension of such facilities across the state when the work on that section shall have been completed.

# Coal Rates to Lakes Reduced

*I. C. C., changing its mind, orders cuts from Pittsburgh, Northern West Virginia and Ohio*

WASHINGTON, D. C.

THE Interstate Commerce Commission on May 28 made public a re-decision, dated May 9, upon further hearing in the lake cargo coal rate cases, which it had previously decided in 1925, 1917 and 1912, ordering this time a reduction of 20 cents per ton in the rates on bituminous coal from the Pittsburgh, Ohio No. 8 and Cambridge districts of Pennsylvania, Ohio and northern West Virginia to the lower Lake Erie ports for transshipment by vessel, which it held two years ago were reasonable. The reduction was ordered, effective on or before August 10, for the purpose of increasing the differentials previously fixed between the rates from the northern district coal fields and those from the southern district fields, principally in southern West Virginia and Kentucky. The latter are 25 to 40 cents per ton higher than those for the northern fields but are considerably less on a mileage basis.

The new decision was made after a reconsideration asked by the original complainants, the Pittsburgh Coal Producers' Association and others and the Eastern Ohio Coal Operators' Association and others, following the commission's decision of July 16, 1925, in which the rates from the complaining districts as well as those from the so-called "preferred districts" were held to be just and reasonable, not unduly prejudicial, unduly preferential or otherwise unlawful. These complainants, as well as the operators in the Fairmont district of northern West Virginia, had alleged that their rates were unreasonable per se as well as in relation to those of the other coal districts. In the original case the commission was asked to exercise its powers to prescribe minimum rates from the "preferred districts" but this position was abandoned at the rehearing.

Without specifically prescribing differentials, the commission finds the rates complained of from the three northern districts unreasonable in themselves but not unduly prejudicial. "It is expected," however, that the carriers will increase the differentials between the three northern districts and the southern districts by the amount of the reduction in the rates from the former, and, without considering whether the rates from the southern district are lower than reasonable minima, the commission is "of the opinion" that the carriers would not be justified in reducing the present rates from those districts.

Commissioner Hall in a separate opinion raises the question whether this is "monitory" or "minatory," but the majority report explains that it has refrained from finding the present rates "unduly prejudicial" on the ground that the carriers serving the competing regions are not the same.

## Hoch-Smith Resolution a Factor

Since the 1925 decision there have been some changes in the membership of the commission and the commission finds some changes in conditions as well as in the way it views the conditions. While various reasons are given for its conclusions, including comparative cost studies, the commission also finds that the Hoch-Smith resolution requires it to give consideration to the depressed condition of the coal industry in the Pittsburgh and Ohio districts. The complainants in this case were among the very first to invoke before the commission

the provisions of the Hoch-Smith resolution, shortly after its passage, after the resolution had been amended in the Senate to apply to any industry as well as to agriculture.

The present rate of \$1.66 from the Pittsburgh district is ordered reduced to \$1.46 and the rate of \$1.63 from the Ohio No. 8 and Cambridge districts to \$1.43. While the complaint of the Fairmont district operators is dismissed and the rates are not found either unreasonable or unduly prejudicial, as alleged, the commission finds that the \$1.81 rate "might be reduced" to \$1.71 without creating too small a differential.

Although specifically finding the rates to be reduced "not unduly prejudicial" the report says that the reductions ordered "will go far toward removing the alleged undue preference."

The lake cargo cases have been among the most hotly contested ever before the commission, involving as they do the keen competition for the coal market of the Northwest which in recent years has been largely transferred to the non-union southern districts.

Although the commission is more nearly unanimous than it was two years ago, Commissioners Eastman, Campbell and McManamy join in an opinion "concurring in part" and favoring a still greater reduction in the rates, to \$1.40 from the Pittsburgh district and \$1.35 from the Ohio No. 8 and Cambridge districts. They also do not agree with the finding that no undue preference or prejudice exists and favor a decision prescribing specific differentials. Commissioner Hall wrote a separate opinion dissenting in part, in which Commissioner Woodlock concurred, asserting that "the finding of unreasonableness made by the majority is not supported in fact or in law" and observing that most of the reasons given in the majority report "point just as forcibly to reductions in the rates from the southern districts." Commissioner Meyer was absent but it is stated that had he been present he would have voted against the report. Commissioner Brainerd, who was appointed to the commission after the Senate had refused to confirm the appointment of Cyrus E. Woods of Pennsylvania, and who took office after the cases had been reargued, did not participate in their disposition.

Commissioner Taylor wrote a concurring opinion in which he points out that the revenue per ton-mile from the complaining districts to the lake ports ranges from 9.32 mills to 9.78 mills, whereas the revenue per ton-mile from the so-called "preferred districts" to the same ports ranges from 4.06 mills to 6.93 mills, while the average distance from typical points in the Pittsburgh district is 178 miles and in the southern fields approximately 385 miles.

The commission's conclusions upon rehearing are as follows:

## Conclusions

The finding in our previous report that the rates from the complaining districts were not unreasonable was based largely on comparisons with the local rates on commercial coal to the ports or similar rates to other points. At that time the majority did not see sufficient reason for reducing the rates on lake-cargo coal which were already somewhat lower than the rates on commercial coal. Upon further hearing, however, additional facts have been brought to our attention which with



the facts theretofore of record indicate the propriety of lower rates on lake-cargo coal than commercial coal. Among these facts now of record are the more concentrated movement of lake-cargo coal, its movement at a more favorable season of the year than the heaviest movement of commercial coal, the larger proportion of joint-line hauls in the case of commercial coal, the difference in the terminal delivery service, and the greater availability of cars used for shipping lake-cargo coal for return loading with ore. The voluntary maintenance by the carriers of rates on lake-cargo coal from 78 to 95 per cent of the corresponding rates on commercial coal is not without significance. The lake-cargo rates are in the nature of proportional rates, and we have frequently prescribed such rates on a lower basis than the corresponding local rates. Upon further consideration, therefore, in the light of the present record, we are of the opinion that the comparisons with the rates on commercial coal are not conclusive as to the reasonableness of the rates assailed.

### Rate Comparisons

Upon the more complete record now before us, we are of the opinion that the rates on the same class of traffic from other districts in the same region shipping a large amount of lake-cargo coal are entitled to more weight in passing upon the reasonableness of the rates assailed than any other rate comparisons, although we take into consideration that such rates from the southern districts may not be reasonable maxima in all instances. In reaching our original decision, there was no doubt in the minds of at least some of those constituting the majority that the rates from the Pittsburgh and Ohio districts were relatively much higher than those from the southern districts; but as stated, the majority did not then regard the rates assailed as unreasonable largely because of the comparisons with rates on commercial coal, the record did not justify the prescribing of minimum rates from the southern districts and no undue prejudice or preference could be found because the rates from the complaining districts and from the southern districts were controlled by different carriers.

### Changed Trend of Movement

The record on further hearing differs materially from the original record in respect to the trend of the movement of lake-cargo coal from the various districts. In our original report we pointed out that in 1923 Ohio No. 8 shipped more lake-cargo coal than all the Kentucky districts combined, but on further hearing it is shown that in 1924 Ohio No. 8 shipped 663,000 tons less than Kentucky, and in 1925 Kentucky shipped 5,291,000 tons more than Ohio No. 8, or about four times as much as the latter. Likewise, we pointed out that the rate of increase in the tonnage shipped from Ohio No. 8 and Cambridge up to 1923 was much greater than for southern West Virginia, but it is now shown that the combined tonnage from the two Ohio districts declined in 1924 and for 1925 was less than one-third that in 1923, while the tonnage from southern West Virginia increased in 1924 and for 1925 was nearly double that in 1923. Ohio No. 8 and Cambridge shipped more than one-half as many tons as southern West Virginia in 1923, but in 1925 southern West Virginia shipped 10 times as much as the two Ohio districts. The tonnage shipped from the Pittsburgh district has continued to fall off since the original hearings but at a much more rapid rate, that for 1924 being less than one-half of 1923 and for 1925 less than one-third of 1923. In our original report we stated that of the total lake-cargo tonnage of high-volatile coal in 1923, Pennsylvania and Ohio districts taking rates of \$1.66 or less shipped 60.4 per cent, while all of West Virginia and Kentucky shipped 39.6 per cent. In contrast to those figures, it now appears that in 1925 all of Ohio and Pennsylvania shipped only about 18 per cent of the total tonnage, while West Virginia and Kentucky shipped practically all of the remaining 82 per cent. This marked change in conditions is evidently due principally to the higher cost of producing and marketing coal in the Ohio and Pennsylvania districts. The higher cost is no doubt due to various causes, but it is apparent that the freight rates contribute to the cost of producing and marketing coal in the complaining districts, and as stated, those from the Pittsburgh and Ohio districts are relatively much higher than those from the southern districts.

At the time of the original hearings the coal-mining industry in Ohio and Pennsylvania was in a comparatively prosperous condition. Since then 12,000 to 15,000 miners have left the Ohio mines, there has been a large increase in the number of vacant houses in the mining communities, and merchants have large amounts of unpaid accounts upon their books. In the Pittsburgh district miners have been given help in getting transportation to the southern fields, from 1921 to 1925 the number of employees engaged in coal mining decreased 20 per

cent while employees in other industries increased 40 per cent, and the coal business is in a depressed condition. It does not appear that all this is due solely to the rate adjustment, but if that adjustment is improper it is our duty to correct it so far as possible, and we must give consideration to the conditions existing in the industry under the provisions of the Hoch-Smith resolution.

As pointed out in our original report, complainants' cost studies were criticized by defendants in various respects, the results shown are based upon several assumptions, and at best they are only approximations; but after resolving doubts against these studies, we believe that they are sufficient to show that the costs warrant a substantial reduction in the rates from the complaining districts in Ohio and Pennsylvania. While we might not require a reduction in the rates assailed merely because the costs warrant it, that fact is of importance in considering whether the rates may be reduced to relate them more fairly to those from the southern districts. Our conclusion regarding the cost of the service is supported by what was said on the same subject in the *Boileau case*.

Our previous findings were also based in part upon the fact that the rates assailed resulted from those prescribed in 1912, with only the subsequent general increases and reductions, and the differentials are the same as those prescribed in 1917. It cannot be denied, however, that the increases have been proportionately greater in the rates from the complaining districts than in those from the southern districts, and in fact proportionately greater than in the class and commodity rates generally in the same territory. It is true that we approved the manner of increasing these rates, and we have held that such increases were not proof that the resulting rates were unreasonable, but this does not prevent us from according relief from rates so increased where the facts otherwise justify it, and we did accord relief from rates approved in 1917 and later modified only by the general increases and reduction in the *Ohio-Michigan Coal Cases*. The present record shows clearly that the circumstances and conditions now existing are materially different from those existing at the time of the decision in the *Boileau case* in 1912 and the *Lake Cargo Coal Case* of 1917.

Briefly summarizing, in reaching our conclusions upon the questions of reasonableness, we have taken into consideration the unusually favorable circumstances and conditions surrounding the movement of lake-cargo coal, which make the rates thereon in a class by themselves; the relatively much lower rates from the southern districts, which the carriers serving those districts find profitable to maintain; the very decided change in the relative tonnage of lake-cargo coal shipped from the complaining Pittsburgh and Ohio districts and the southern districts, respectively; the present depressed condition of the coal-mining industry in the Pittsburgh and Ohio districts; and the fact that the cost of the service warrants a substantial reduction in the rates. We have taken into consideration particularly the changed conditions since our previous decisions regarding these rates, also to some extent the rates on ore from the ports to points in or near the complaining Pittsburgh and Ohio districts, and other evidence which need not be specifically referred to in the comprehensive record now before us.

### Reasons for Changed Conclusions

Upon this issue of undue prejudice and preference, the facts of the *Swift Lumber Co. case*, *supra*, relied upon by the Pittsburgh and Ohio complainants, are somewhat different from those of this case, where there are several carriers forming through routes from the complaining districts to the ports which do not participate in the rates or traffic from the preferred districts, and likewise there are certain carriers forming important through routes from the southern West Virginia and eastern Kentucky districts which do not participate in the rates or traffic from the complaining districts. The last mentioned routes are those formed by the Chesapeake & Ohio or Norfolk & Western in connection with the Hocking Valley. The fact that the latter joins with certain of the lines serving the complaining districts in joint rates from some of the preferred districts does not make it responsible for the rates maintained by the other lines from the complaining districts, but even if it did, the Hocking Valley's withdrawal from the joint rates referred to would not affect the same rates maintained by it in connection with the Chesapeake & Ohio or Norfolk & Western. It is true that undue prejudice and preference were found in the *Lake Cargo Coal Case* of 1917, but it does not appear that the question here raised was considered in that case; and, moreover, the finding there applied to the differentials over the Ohio No. 8, Cambridge, and Hocking districts, which all take the same rates, but the last-mentioned district is served by the Hocking Valley, so the situation was different. Under the circumstances of the present case, we have for many years held that no undue prejudice or preference may be found, following *Ashland Fire Brick Co. v. S. Ry. Co.*, 22 I. C. C. 115. The

doctrine of that case has been recognized and followed since the decision of the Supreme Court in the *Swift Lumber Co. case*. See *Lake Dock Coal Cases*, 89 I. C. C. 170, 185.

Upon further hearing we find that the rates assailed in Nos. 15007 and 15007 (Sub-No. 1) are, and for the future will be, unreasonable to the extent that they exceed or may exceed \$1.46 per ton from the Pittsburgh district and \$1.43 from the Ohio No. 8 and Cambridge districts. We do not regard the present relationships between the rates from the complaining Pittsburgh-Ohio districts and the southern districts as proper, but the reductions required in the rates from the Pittsburgh and Ohio districts will go far toward removing the alleged undue prejudice to those districts, and following the principle of the *Ashland Fire Brick case*, we adhere to our previous findings on the question of undue prejudice and preference. It is expected, however, that the carriers will increase the differentials between the above-mentioned districts and the southern districts by the amount of the reduction in the rates from the former, subject to what is said below regarding the rates from the Fairmont district. The record is not sufficiently developed to warrant specific findings with respect to the relationships between the rates from the complaining Pittsburgh and Ohio districts and other districts in Ohio, Pennsylvania, and Maryland which ship lake-cargo coal, but the carriers should be prepared to justify any change in the present differentials between those districts with the exception of the differential from Connellsville over Pittsburgh, which is now 40 per cent of the differential from Fairmont over Pittsburgh and might properly be increased to the same percentage of the differential from Fairmont over Pittsburgh that is established pursuant to this decision. Under the issues now presented, it is unnecessary for us to consider whether the rates from the southern districts are lower than reasonable minima, but we are of the opinion that the carriers would not be justified in reducing the present rates from those districts. This does not apply to the rates from the Fairmont district, which might be reduced to \$1.71 without creating too small a differential over those from the Pittsburgh and Ohio districts. We do not, however, find the rates from the Fairmont district unreasonable or unduly prejudicial as alleged.

#### Commission Declines to Consider Wage Scales

District No. 12 of the United Mine Workers of America, an organization of Illinois mine workers, contended, in substance, that the rates should be adjusted to reflect differences in wages scales that prevail in the Illinois fields and in the southern districts, and that the rates from the latter districts in which the wage scale is lower than that in the Illinois fields could be increased. It further contended that if any reduction is made in the rates from the complaining districts corresponding reductions should be required in the rates from the Illinois fields. As to these contentions the report says:

"Under the issues before us, we can only determine whether the rates assailed from the complaining districts are just, reasonable, and free from undue prejudice. It is no part of our duty to canvass and compare wage scales and other expenses and incidents of industrial operation, or the social and economic conditions stressed by this intervenor with the view of adjusting the rate structure to them. Furthermore, the rates from the Illinois fields are not before us in this proceeding."

#### Dissenting Opinion

Commissioner Hall pointed out that starting from amounts prescribed by the commission in 1912 as reasonable, each successive change in the rates has been made under direct exercise of federal authority by the director general of railroads or the commission, and that "judged by all standards which we are wont to apply, the assailed rates must be reasonable." He also asserted that "the coal rates maintained by such coal-carrying machines as the Chesapeake & Ohio, Virginian, Norfolk & Western and to some extent the Louisville & Nashville, over roads constructed and equipped primarily for that purpose, are not necessarily or properly to be taken as a measure for the coal rates of such carriers as the Pennsylvania, the New York Central, and the Baltimore & Ohio, with their vast and varied traffic, passenger and

freight, unless and until a basis for that comparison be laid in a study of their respective costs of carrying coal."

#### The Commission Not a "Special Providence"

Sympathy for "those who have been caught in the undertow," he says, "should not draw us away from the clear path of duty. Congress has not made of us a special providence . . ."

Comparison of tonnages from the several districts in Ohio taking the \$1.63 rate and from the districts taking the \$1.91 rate, moving in great volume from some and little or none from others, clearly indicates that other things beside the rate must account for the difference in tonnages from districts taking the same rate. Those other things, whatever they are, can not be ignored when shift of tonnage is instanced as tending to show that the present rate is higher than the traffic will bear or the value of the service justify. It is easy and natural to make of the rate adjustment a scapegoat when prices fall or markets are slipping away to competitors—easy because freight rates are tangible, and natural because freight rates are subject to governmental regulation where prices, and costs, and wages, and the myriad incidents of business operation, are not. But rate regulation would be denatured if made into an equalizer of the fortunes and abilities of men, whether in the same or different localities. Its function is to keep freight rates within the bounds of reason and fairness in the light of attendant or surrounding transportation conditions, and thereby to afford to all persons and localities the benefit of adequate transportation service. This done, its function is performed, leaving to individual initiative to deal with the many and complex industrial problems of our time. These problems we need not even discuss. We have for them as a regulating body no solution.

Whether the opinion expressed that the carriers serving the southern districts would not be justified in reducing their rates be "monitory" or "minatory," he says:

It goes outside the findings and prejudices issues which may hereafter come before us for determination in the manner contemplated by law. The query must follow: what right have we to invade the domain which the law has allotted to carrier management and to seek by hint, suggestion, warning or threat to coerce carriers into a course of action other than that which they have chosen or may choose to take? The essence of the transportation act is regulation and not management. That act was not a general reform act, giving us powers to redistribute the business or the wealth of individuals, or of producing regions, in accordance with whatever social, economic, or sectional views might at a given time command a majority of votes in this commission. These admonitions, or foreshadowings, or requirements, whatever they may be called, would seem to be prompted by a desire to afford a relief which can not be afforded upon the record made, and to result from the impulse which prompted the majority "in considering whether the rates (from the complaining districts) may be reduced to relate them more fairly to those from the southern districts."



New Roundhouse (Left) and Machine Shop, D. & R. G. W., at Salida, Colo.





*Aeroplane View of the Hump and Eastbound Classification Yard*

# Humping Four Thousand Cars a Day

*The methods by which the Belt Railway of Chicago classifies a heavy traffic at Clearing, Ill.*

**T**HE Belt Railway of Chicago classifies about 1,500,000 cars of freight annually in its yards at Clearing, Ill., just southwest of Chicago. This is the equivalent of 125,000 cars per month, or slightly more than 4,000 cars a day. In one 10-hour shift during a busy season, 3,007 cars have been classified, or more than 300 cars an hour and it is estimated that it is possible to classify 10,000 cars a day in these yards.

The Belt Railway of Chicago is the inner of the three belt lines serving that city and is owned by 13 railroads. Connection is made with all of the railroads entering Chicago. The traffic moving through Clearing consists largely of the general run of raw materials and manufactured products with large seasonal movements of coal and grain. In addition, an average of about 500 cars of perishables is handled daily during the summer season.

## Clearing Is Largely an Interchange Yard

Clearing yard was constructed in 1915. It is situated practically midway between the termini of the Belt railway and extends due east and west. The yard is about five miles long and a half mile wide and contains 180 miles of tracks. Twelve of the 13 owning lines operate into Clearing with their own crews and thus effect what amounts to practically direct interchange.

In nearly all cases the transfer crews that bring trains in also take trains out, eliminating light runs, conserving power and increasing efficiency. The receiving and departure yards are so located as to facilitate this practice, the north and westbound receiving and departure yards being side by side at the west end of the yard and the east and southbound yards being adjacent in the east end of

the yard. Transfer crews bringing trains into the receiving yards are thus enabled to pick up outgoing trains from the departure yard with a minimum of switching. The general scheme of operation tends to keep the cars in a direct movement east and west.

The classification yard consists of four units, containing 26 classification tracks each and the leads over the hump are so arranged that it is possible to hump cars with four crews at the same time, operating each yard as a separate unit. These units are known as A, B, C and D; A being the northeast unit, B, the southeast unit, C the southwest unit and D the northwest unit. The tower at the head of the hump extends over all four leads and is equipped to accommodate four towermen. In actual practice, however, it has been found necessary to utilize only two of the four units for interchange classification, A and C, one on each side of the hump, the other two, B and D, being used to classify business for the 375 industries located on the line of the Belt railway and for company coal. Occasionally, during times of heavy business, B and D yards are also used for the overflow from the interchange classification yards, A and C.

In addition to the classification yards, there are two flat switching yards, one located just east of classification yard B, and the other just west of classification yard D. Receiving and departure tracks for the eastern and southern lines are situated side by side at the extreme east end of the yards, while the same facilities for the western and northern lines are at the extreme west end. An icing station in the east yard is equipped with the necessary tracks to take care of perishable traffic. Turntables and water tanks for transfer engines have been



built along the leads in both the east and west yards. The Belt railway runs west from its eastern terminus at South Chicago to Clearing, where it turns north and

continues in almost a straight line to its northern terminus at Cragin Junction. The yard forms a continuation of the east and west line and lies at right angles to the north and south line.

This made necessary the construction of a lead from the north and south line to the west end of the yards. All cars from the north and west, intended for the south and east and requiring humping at Clearing, must go around the lead to the west end of the yard. Similarly, all business from the south and east, going to the west and north, and humped at Clearing, must be handled over this lead outbound.

To facilitate movements in general and for use in case of a blockade of any of the leads due to accidents or other causes, thoroughfare tracks, roughly in the shape of a figure 8, encircle both yards, with a connecting track between the north and south thoroughfare tracks passing under the hump. This connecting track is equipped with a double wye at its connections with both the north and south tracks. The yard is illuminated by flood and arc lights for night operation.

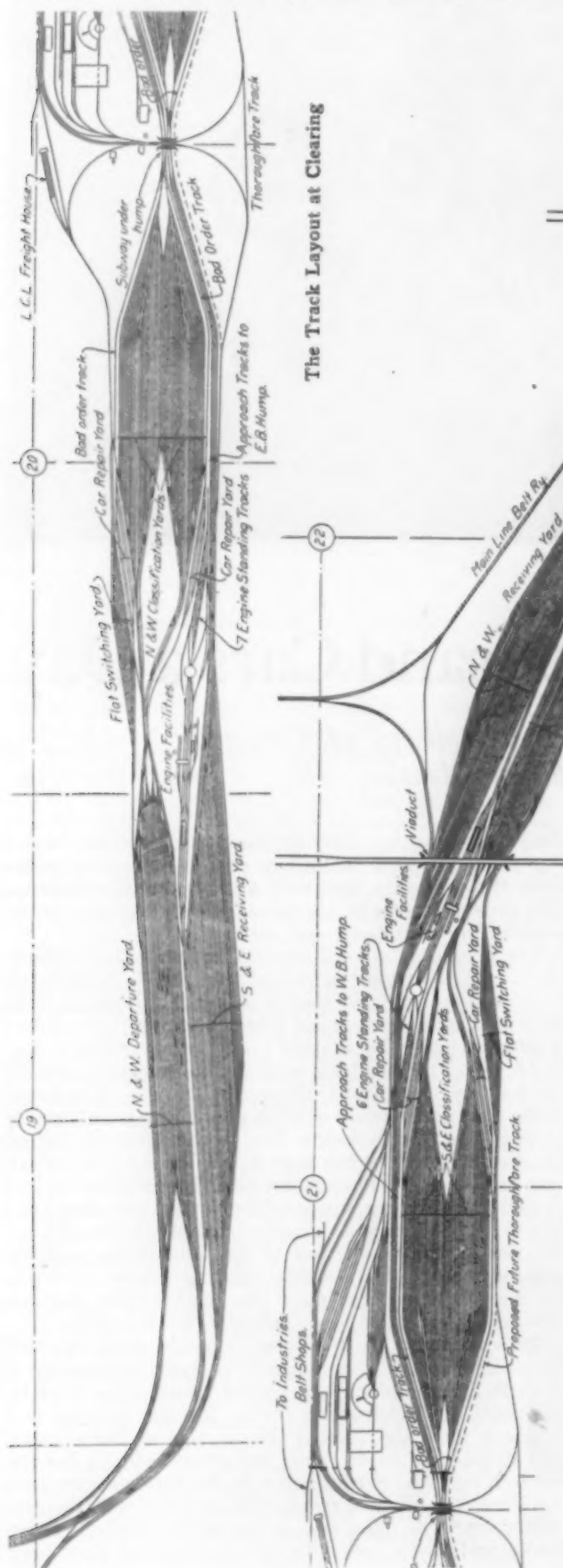
### The Yard Operations

When a train arrives from the south or east with cars for the north or west, it is placed in the east receiving yard. A yard clerk checks the train as it pulls in while the conductor delivers his bills to the east yard office, where a multiple list is prepared in the same order as the cars in the train, copies of which are distributed by a pneumatic tube system to the west yard office, to the towerman, the checker and the conductor at the hump, and to the superintendent's office. In the meantime, the train has been inspected for defects. The cars are then taken up to the hump over the lead tracks which are situated at the north side of classification yard A.

The humping crew consists of a conductor and two brakemen. The conductor handles the switch list and also the signal at the top of the hump which governs the speed of the humping locomotive. One brakeman cuts the cars, under the instructions of the conductor, as they go over the hump, while the other brakeman is stationed on the opposite side of the cars to see that the knuckles are opened and to fix the chains for the riders if necessary. The switches are governed by an electro-pneumatic machine which is controlled by the towerman.

The checker at the top of the hump assigns the car riders to the various cars as they go over the hump. Track skates are placed at the end of each classification track to prevent cars from running out and fouling ladder tracks, while a skate operator is stationed in a shanty about one-third of the way down the switch ladder to place skates for cars which get away from the riders, the tower being equipped with a whistle signal for calling the skateman when this occurs.

East and southbound cars from the north and west are brought to the receiving yard at the west end over the lead previously described, and their classification is handled in exactly the same way as the north and westbound cars, except, of course, that they move through the



yards from west to east and use the south lead over the hump instead of the north lead. Duplicate facilities are provided for both movements.

### A Typical Day

The accompanying analysis at Clearing was made covering hump operations on March 23, a typical day for this season of the year, when 1,947 east and southbound cars and 1,868 north and westbound cars were humped, a total of 3,815 cars:

A summary of these figures indicates that the average elapsed time between the arrival of the cars in the receiving yard and the time they were humped was 2 hr. 9 min. on the day shift, and 1 hr. 34 min. on the night shift for A and B yards; and that it was 2 hr. 58 min. on the day shift and 3 hr. 35 min. on the night shift for C and D yards, or an average elapsed time on all cars humped of 2 hr. 49 min. An analysis of the time consumed in humping is also interesting. The time given is the total elapsed time, which includes all delays and 30 min. for lunch. During the day shift 1,035 cars with 745 cuts were humped in the A and B yards in 9 hr. 5 min., or 31 sec. per car; while on the night shift 912 cars with 683 cuts were humped in 9 hr. 25 min., or at the rate of 37 sec. per car; in C and D yards the day shift humped 972 cars with 679 cuts in 9 hr., or an average of 33 sec. per car; while the night shift humped 896 cars with 651 cuts in 9 hr. 10 min., or 36 sec. per car. In other words, during the tour of duty of the two shifts working into the four yards, including minor delays, and two lunch periods of 20 min. each, a car rolled down the hill from each hump every 34 sec. Since the two humping leads were, of course, operated simultaneously, a car rolled down one of the humps every 17½ sec.

These results were accomplished with 36 crews in the 24-hour period, of which 12 were on the hump, 12 pull-down engines, 2 engines on each shift on each side of the hump to pull cars from the classification yard to the departure yard and 6 engines for flat switching, roustabout work and industry switching in the Clearing district.

The supervisory force includes a superintendent, a trainmaster and an assistant trainmaster, whose offices are immediately adjacent to the hump at Clearing, but whose territory covers the entire line of the Belt railway. Clearing yard proper is supervised, in addition, by a general yardmaster, an assistant general yardmaster and 8 yardmasters. Of the latter, two are stationed at the east yard office, one at the west yard office and one at the hump. They operate in two shifts of four yardmasters each and the organization of the day and the night shifts is the same.

### The Car Riders

In yards of this character, car riders are the greatest single factor tending to loss of time and money, unless properly supervised. Recognizing this, the officers of this road have devoted much time and attention to the problem of getting an efficient force of car riders and having it operate satisfactorily.

A total of 60 to 80 car riders is employed at Clearing each day. These men are all qualified switchmen assigned to hump service regularly and if a larger force is necessary they are called off the extra board as they are needed. Under this system an extra man may be riding cars one day and be employed in any of the other duties of a switchman the next. By this means, a higher class of men is obtained as riders than is usually possible and the personal injuries, damage to lading and equipment, and pilferage are all much smaller than if a less stable force were employed.

Each rider is handled as an individual, that is to say,

they are not grouped in gangs but a record is kept of the daily performance of each rider as a separate unit. The checkers at the top of the hump, under the supervision

### An Analysis of the Operations at Clearing

| A AND B YARD |                 |                      |               |                    |
|--------------|-----------------|----------------------|---------------|--------------------|
| No. of cuts  | Time of arrival | Day Shift            |               | No. of cars humped |
|              |                 | Time humping started | Time finished |                    |
| 14           | 4:15 a.m.       | 7:15 a.m.            | 7:35 a.m.     | 16                 |
| 10           | 2:00 a.m.       | 7:15 a.m.            | 7:35 a.m.     | 35                 |
| 43           | 6:05 a.m.       | 7:35 a.m.            | 8:00 a.m.     | 50                 |
| 30           | 11:50 p.m.      | 8:00 a.m.            | 8:20 a.m.     | 42                 |
| 35           | 2:25 a.m.       | 8:25 a.m.            | 8:40 a.m.     | 53                 |
| 2            | 7:20 a.m.       | 8:50 a.m.            | 9:10 a.m.     | 7                  |
| 14           | 7:50 a.m.       | 8:50 a.m.            | 9:10 a.m.     | 15                 |
| 26           | 2:10 a.m.       | 8:50 a.m.            | 9:10 a.m.     | 34                 |
| 43           | 7:50 a.m.       | 9:10 a.m.            | 9:30 a.m.     | 70                 |
| 47           | 7:20 a.m.       | 9:30 a.m.            | 9:55 a.m.     | 66                 |
| 8            | 8:15 a.m.       | 10:00 a.m.           | 10:05 a.m.    | 18                 |
| 38           | 9:30 a.m.       | 10:20 a.m.           | 10:40 a.m.    | 44                 |
| 42           | 9:45 a.m.       | 10:50 a.m.           | 11:15 a.m.    | 74                 |
| 61           | 10:00 a.m.      | 11:20 a.m.           | 12:05 p.m.    | 91                 |
| 50           | 10:00 a.m.      | 12:05 p.m.           | 12:25 p.m.    | 63                 |
| 12           | 9:55 a.m.       | 12:55 p.m.           | 1:00 p.m.     | 16                 |
| 95           | 12:15 p.m.      | 1:25 p.m.            | 2:05 p.m.     | 135                |
| 35           | 12:30 p.m.      | 2:05 p.m.            | 2:25 p.m.     | 44                 |
| 48           | 1:15 p.m.       | 2:25 p.m.            | 3:05 p.m.     | 62                 |
| 48           | 1:30 p.m.       | 3:05 p.m.            | 3:40 p.m.     | 59                 |
| 23           | 1:15 p.m.       | 3:40 p.m.            | 4:20 p.m.     | 30                 |
| 21           | 2:15 p.m.       | 3:40 p.m.            | 4:20 p.m.     | 27                 |

Total.....1,035

| Night Shift |                 |                      |               |                    |
|-------------|-----------------|----------------------|---------------|--------------------|
| No. of cuts | Time of arrival | Time humping started | Time finished | No. of cars humped |
| 36          | 4:15 p.m.       | 6:00 p.m.            | 6:25 p.m.     | 45                 |
| 55          | 5:30 p.m.       | 6:25 p.m.            | 7:00 p.m.     | 70                 |
| 13          | 4:00 p.m.       | 7:05 p.m.            | 7:10 p.m.     | 24                 |
| 17          | 6:30 p.m.       | 7:10 p.m.            | 7:30 p.m.     | 22                 |
| 33          | 4:15 p.m.       | 7:30 p.m.            | 7:50 p.m.     | 37                 |
| 12          | Holdovers       | 8:05 p.m.            | 8:15 p.m.     | 14                 |
| 22          | 2:15 p.m.       | 8:15 p.m.            | 8:30 p.m.     | 27                 |
| 55          | 7:20 p.m.       | 8:35 p.m.            | 9:15 p.m.     | 63                 |
| 52          | 7:55 p.m.       | 9:20 p.m.            | 9:55 p.m.     | 65                 |
| 2           | 7:55 p.m.       | 9:15 p.m.            | 9:20 p.m.     | 6                  |
| 61          | 8:50 p.m.       | 9:55 p.m.            | 10:40 p.m.    | 102                |
| 52          | 9:35 p.m.       | 10:40 p.m.           | 11:20 p.m.    | 64                 |
| 38          | 10:05 p.m.      | 11:55 p.m.           | 12:20 a.m.    | 60                 |
| 52          | 11:05 p.m.      | 12:20 a.m.           | 12:55 a.m.    | 70                 |
| 18          | 7:15 p.m.       | 12:55 a.m.           | 1:05 a.m.     | 23                 |
| 21          | 11:00 p.m.      | 1:05 a.m.            | 1:25 a.m.     | 31                 |
| 44          | 11:40 p.m.      | 1:25 a.m.            | 2:00 a.m.     | 63                 |
| 19          | 11:40 p.m.      | 2:00 a.m.            | 2:20 a.m.     | 20                 |
| 26          | 12:25 a.m.      | 2:20 a.m.            | 2:40 a.m.     | 33                 |
| 56          | 2:20 a.m.       | 2:50 a.m.            | 3:25 a.m.     | 73                 |

Total.....912

| C AND D YARD |                 |                      |               |                    |
|--------------|-----------------|----------------------|---------------|--------------------|
| No. of cuts  | Time of arrival | Day Shift            |               | No. of cars humped |
|              |                 | Time humping started | Time finished |                    |
| 23           | 3:45 a.m.       | 7:15 a.m.            | 7:50 a.m.     | 40                 |
| 15           | 6:30 a.m.       | 7:15 a.m.            | 7:50 a.m.     | 23                 |
| 58           | 2:25 a.m.       | 7:50 a.m.            | 8:30 a.m.     | 76                 |
| 33           | 11:15 p.m.      | 8:30 a.m.            | 8:55 a.m.     | 44                 |
| 4            | 8:50 p.m.       | 8:30 a.m.            | 8:55 a.m.     | 5                  |
| 47           | 1:50 a.m.       | 8:55 a.m.            | 9:25 a.m.     | 57                 |
| 28           | 4:25 a.m.       | 9:25 a.m.            | 9:50 a.m.     | 51                 |
| 37           | 6:55 a.m.       | 9:50 a.m.            | 10:15 a.m.    | 70                 |
| 42           | 7:45 a.m.       | 10:15 a.m.           | 10:40 a.m.    | 63                 |
| 57           | 9:25 a.m.       | 10:40 a.m.           | 11:15 a.m.    | 76                 |
| 50           | 9:35 a.m.       | 11:20 a.m.           | 11:50 a.m.    | 62                 |
| 27           | 10:25 a.m.      | 11:50 a.m.           | 12:15 p.m.    | 38                 |
| 40           | 10:05 a.m.      | 12:55 p.m.           | 1:20 p.m.     | 65                 |
| 53           | 10:50 a.m.      | 1:20 p.m.            | 2:00 p.m.     | 73                 |
| 12           | 11:40 a.m.      | 2:00 p.m.            | 2:30 p.m.     | 15                 |
| 6            | 11:15 a.m.      | 2:00 p.m.            | 2:30 p.m.     | 8                  |
| 16           | 3:15 a.m.       | 2:00 p.m.            | 2:30 p.m.     | 25                 |
| 45           | 11:15 a.m.      | 2:30 p.m.            | 3:05 p.m.     | 53                 |
| 24           | 1:40 p.m.       | 3:05 p.m.            | 3:30 p.m.     | 40                 |
| 17           | 12:15 p.m.      | 3:05 p.m.            | 3:30 p.m.     | 24                 |
| 45           | 1:30 p.m.       | 3:30 p.m.            | 4:15 p.m.     | 64                 |

Total.....972

| Night Shift |                 |                      |               |                    |
|-------------|-----------------|----------------------|---------------|--------------------|
| No. of cuts | Time of arrival | Time humping started | Time finished | No. of cars humped |
| 36          | 11:40 a.m.      | 6:00 p.m.            | 6:20 p.m.     | 52                 |
| 29          | 3:00 p.m.       | 6:30 p.m.            | 6:40 p.m.     | 41                 |
| 51          | 3:25 p.m.       | 6:40 p.m.            | 7:15 p.m.     | 60                 |
| 39          | 3:40 p.m.       | 7:15 p.m.            | 7:45 p.m.     | 51                 |
| 25          | 2:20 p.m.       | 7:50 p.m.            | 8:00 p.m.     | 37                 |
| 7           | 12:30 a.m.      | 8:00 p.m.            | 8:10 p.m.     | 13                 |
| 33          | 3:50 p.m.       | 8:10 p.m.            | 8:35 p.m.     | 48                 |
| 11          | 6:00 p.m.       | 8:35 p.m.            | 8:40 p.m.     | 13                 |
| 43          | 4:10 p.m.       | 8:40 p.m.            | 9:10 p.m.     | 55                 |
| 41          | 6:00 p.m.       | 9:15 p.m.            | 9:45 p.m.     | 67                 |
| 52          | 3:40 p.m.       | 9:45 p.m.            | 10:25 p.m.    | 59                 |
| 13          | 3:30 p.m.       | 10:25 p.m.           | 10:35 p.m.    | 15                 |
| 20          | 8:30 p.m.       | 10:35 p.m.           | 10:55 p.m.    | 29                 |
| 38          | 7:05 p.m.       | 10:55 p.m.           | 11:25 p.m.    | 62                 |
| 11          | 7:05 p.m.       | 11:55 p.m.           | 12:10 a.m.    | 23                 |
| 17          | 8:30 p.m.       | 12:10 a.m.           | 12:20 a.m.    | 22                 |
| 27          | 5:20 p.m.       | 12:20 a.m.           | 12:40 a.m.    | 30                 |
| 13          | 7:10 p.m.       | 12:40 a.m.           | 12:55 a.m.    | 22                 |
| 29          | 4:30 p.m.       | 1:00 a.m.            | 1:20 a.m.     | 40                 |
| 2           | 7:45 p.m.       | 1:20 a.m.            | 1:25 a.m.     | 8                  |
| 36          | 11:50 p.m.      | 1:40 a.m.            | 2:00 a.m.     | 49                 |
| 28          | 10:30 p.m.      | 2:00 a.m.            | 2:20 a.m.     | 30                 |
| 50          | 10:30 p.m.      | 2:30 a.m.            | 3:10 a.m.     | 70                 |

Total.....896

of the hump yardmaster, keep an accurate record of the number of rides made by each rider, of the number or numbers of the cars he has ridden, and of the average time of each ride. In effect, they act as dispatchers for the car-riding force. The riders are returned from the yards by means of electric speeders on four speeder tracks, one to each unit.

By keeping a check of the car numbers ridden by each rider, damage to equipment and lading is materially reduced, since each man is aware of the fact that each car he rides is considered his direct responsibility and he is naturally more careful under the circumstances. The damage done is small. For September, 1926, the latest month for which figures are available, it amounted to less than 0.7 cent per car, while in August, 1926, it was about 0.8 cent per car. It has not been as high as a cent a car for some years past.

#### A Typical Car Riding Day

Using March 23 as an example again, the accompanying statement shows the activities of the car riders on that day:

#### A Statement of the Car Riders' Performance

| Car rider    | Day Shift     |               | Total rides |
|--------------|---------------|---------------|-------------|
|              | Rides in A.M. | Rides in P.M. |             |
| Knotts       | 31            | 19            | 50          |
| Wilcox       | 29            | 18            | 47          |
| Hautenreiser | 29            | 19            | 48          |
| Yeats        | 31            | 19            | 50          |
| Bauman       | 29            | 18            | 47          |
| McDaniel     | 28            | 18            | 46          |
| Hunter       | 28            | 19            | 47          |
| Williams     | 31            | 20            | 51          |
| Elliott      | 31            | 19            | 50          |
| Thompson     | 29            | 17            | 46          |
| Strom        | 31            | 17            | 48          |
| Kusten       | 31            | 16            | 47          |
| Anderson     | 29            | 16            | 45          |
| Ottenstrass  | 28            | 20            | 48          |
| Hale         | 29            | 18            | 47          |
| Hendricks    | 30            | 18            | 48          |
| Gurley       | 28            | 17            | 45          |
| Drish        | 30            | 17            | 47          |
| Kahne        | 30            | 16            | 46          |
| McGinn       | 29            | 19            | 48          |
| Stewart      | 31            | 17            | 48          |
| Gilnow       | 29            | 18            | 47          |
| Navarro      | 29            | 18            | 47          |
| Watt         | 32            | 20            | 52          |
| Gutton       | 31            | 17            | 48          |
| Nolan        | 28            | 17            | 45          |
| Valsch       | 28            | 18            | 46          |
| Blombren     | 29            | 16            | 45          |
| Nelson       | 31            | 18            | 49          |
| Hauer        | 30            | 19            | 49          |
| Callahan     | 29            | 19            | 48          |
| McGinty      | 31            | 18            | 49          |
| McMurray     | 30            | 20            | 50          |

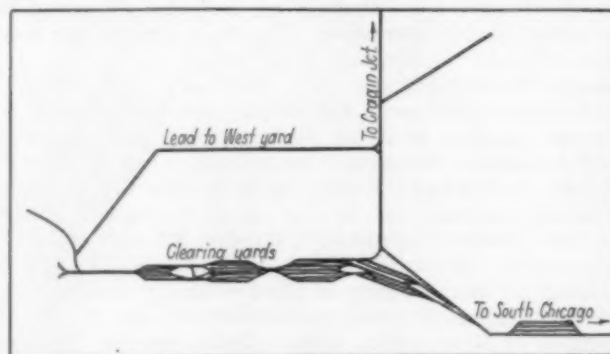
| Car rider  | Night Shift |                 | Total rides |
|------------|-------------|-----------------|-------------|
|            | P.M.        | A.M.            |             |
| Phillips   | 28          | 17              | 45          |
| Hinders    | 29          | 16              | 45          |
| Grady      | 26          | 16              | 42          |
| Martin     | 29          | 18              | 47          |
| Mayer      | 29          | 18              | 47          |
| Carver     | 28          | 16              | 44          |
| Church     | 31          | 15              | 46          |
| Vandenberg | 31          | 19              | 50          |
| Reid       | 29          | 18              | 47          |
| Larson     | 29          | 17              | 46          |
| Ward       | 28          | 16              | 44          |
| Morrow     | 27          | 16              | 43          |
| Brothers   | 29          | 15              | 44          |
| Salstrand  | 31          | 19              | 50          |
| Dusek      | 30          | 17              | 47          |
| Clark      | 29          | 15              | 44          |
| Size       | 30          | 16              | 46          |
| Shepherd   | 27          | 18              | 45          |
| Murphy     | 29          | 18              | 47          |
| Reeves     | 28          | 18              | 46          |
| Schiff     | 28          | Home 11:30 p.m. |             |
| Purchase   | 25          | 16              | 41          |
| Dugan      | 30          | 18              | 48          |
| Dhouitt    | 28          | 18              | 46          |
| Spor       | 31          | 16              | 47          |
| Bishop     | 29          | 18              | 47          |
| Deltolt    | 30          | 17              | 47          |
| McKinstry  | 27          | 17              | 44          |
| Wishy      | 29          | 17              | 46          |
| Moreland   | 29          | 16              | 45          |
| Finish     | 29          | 17              | 46          |
| Blank      | 29          | 16              | 45          |
| Schuman    | 23          | 18              | 46          |

A summary of the day's operating and car riding statements shows that 3,823 cars were ridden by the day

and night shifts. Of these, 2,007 cars were ridden in 9 hr. 5 min. by the day shift of 33 riders, and 1,816 by the night shift in 9 hr. 20 min., also with 33 riders. On this basis, each rider rode an average of 6.27 cars per hour, and made an average of  $5\frac{1}{2}$  rides per hour, or a ride every 10 min. and 54 sec. The average number of cars per hour ridden by the day shift was 6.69 and by the night shift 6.02. Two riders are used on each cut of three loads and more riders for the longer cuts on the same ratio. The cuts do not average very large, however, the yearly average for 1926 being only 1.75 cars per cut.

#### Much Flat Switching Done

The low average number of cars to the cut is due in large measure to the fact that where a train is so ar-



Map Showing Relation of Clearing Yards to Main Line of Belt Railway

ranged upon arrival that only 7 or 8 cuts are necessary for a 60- or 70-car train, it is not put over the hump as it is more economical to classify it by flat switching in the yards provided for that purpose in both the east and west yards. This method of operation is utilized particularly during the coal and grain season, when the make-up of incoming trains is more favorable than otherwise. It has the advantage of saving about 8 miles haul, since such trains from the west and north can be brought over the main line directly to the east end of the yard and from there to the east flat switching yard, avoiding the necessity of hauling the cars to the west end of the yard and then over or around the hump. Similarly, trains from the east and south with cars for the north and west can be classified in the east flat switching yard and then hauled out directly to the north main line, also without going through the yard. Practically all of the perishable movement is handled in the east end of the yard by flat switching, since the icing station is situated there. The west flat switching yard is used principally for industry classification and switching and serves the large and growing Clearing and Argo industrial districts. In all, cars flat switched at Clearing amount to an average of 8,000 cars per month.

IN ROUMANIA, according to press dispatches from Bucharest, more than 50 per cent of the passengers who ride on the government-owned railroads are "deadheads" which state of affairs is blamed for the increasing deficits of these lines.

PENNSYLVANIA COAL DOCK FORCES at Sandusky, O., unloaded a total of 1,254 cars or 73,986 tons of coal into lake boats within a 24-hour period beginning at 7 a. m. on May 6, and thereby beat the previous record on that railroad, which was established at the Toledo docks when 1,126 cars were dumped in 24 hours.



# The Supply Department From the Other Side\*

*The present responsibilities, needs  
and opportunities of this  
service as the user  
views them*

By F. P. Pfahler

Assistant to Chief of Motive Power and Equipment,  
Seaboard Air Line, Savannah, Ga.

**T**O meet the need of a railroad for materials and supplies with a reasonable investment in stocks, without delay to work in progress and without accumulating surpluses which depreciate in value and entail heavy carrying costs is a large problem. The problem divides into two parts: The first has to do with the service of supply to the using department, since the stores department, in its capacity as custodian and issuer of materials and supplies, is strictly an auxiliary department. Its purpose is to serve others more adequately than they can serve themselves and at less expense to the railroad. The stores department has no independent status. It earns no revenue. If it cannot effect substantial economies by reason of the timely supplying of material so as to avoid delay to work in progress by consolidating store stocks and eliminating surplus, and by conserving materials which might otherwise be wasted, then it has failed in its office.

The second part of the stores problem deals with store-keeping, the economical handling of materials and supplies in stock, methods of ordering, receiving, caring for and distributing materials pending their use. Performance in these particulars can best be measured by comparisons with practices in effect elsewhere.

Prudent management and economy of operation demand that materials should be procured of such kind and quantity and delivered at such times and places as will meet the needs of the user, as nearly as they can be determined. If the using departments are not required to give timely information as to their exact needs, and the time and place of delivery to meet those needs it must follow that the stores department has no sure basis on which to provide against the demands those needs create. The stores department may, and does, assume the responsibility of stocking materials which it thinks will be required, and it may rely upon the demand of the past to indicate the needs of the future. With respect to certain staple materials that measure is dependable, but for materials having specific uses, and subject to fluctuating demands which the stores department has no means of estimating, the demands of the past have no relation to the needs of the future. In that case the stores department is assuming the responsibility of determining the quantities and kinds of material to be stocked on the basis of expected demand with no authority to arrange or control that demand. The using department on the other hand which has knowledge of its needs and the power to anticipate and regulate its demands generally assumes

\*From an address before the Southern and Southwestern Railway Club, Atlanta, Ga., May 19.



*Users are Also Proud of an Efficient Supply Service*

no responsibility for material which is carried in stock. Special material which is arranged for in connection with a certain piece of work may be diverted to another job. If, in its anxiety to anticipate demands, the stores department overstocks, it is left with the surplus on its hands and no recourse. If the stores department understocks it is blamed for delays, and if the user over-estimates the surplus material still remains the responsibility of the stores department.

## Material Shortages Costly

These conditions would not exist if the using departments were held responsible for the procurement of and the outlay for their materials in precisely the same way they are now held responsible for the procurement of and the outlay for labor used in applying material. In that event, the using departments would determine their needs for materials with care and in timely fashion so as to enable them to be purchased and delivered at the time and place specified to avoid delays to their work. Being directly responsible for any unused, inappropriate and obsolete materials which they might accumulate as well as definitely chargeable with delays resulting from their failure to anticipate and provide for their requirements, they would naturally be attentive to these matters and would devote their best efforts to avoid, with respect to the material supply, any conditions which would increase costs, which would unprofitably employ invested capital, or which would reflect discredit upon management.

Material shortages are usually brought home with most force when they occasion delays for work in progress. The effect of such delays does not end with embarrassment to the particular job for which the material is lacking. In the case of the mechanical department the whole routine of the shops is disturbed; the unit of equipment is held out of service an undue length of time; the productivity of the investment in shop facilities is lowered; the morale of the workmen is undermined and encouragement is offered to various subterfuges to overcome the effect of failures in timely material deliveries by sequestering material, overordering and resorting to all sorts of makeshifts, which increase the cost of operation. In the long run inadequate service of supply of material may be the responsible cause of

large sums being unnecessarily and unprofitably invested in shops and in locomotives and cars, which would not be required to handle the business of the railroad if shop output was expeditious and the out-of-service time for repairs was reduced to a minimum.

As a rule, there is too much slow-moving material; that is, too great a proportion of the total investment in stores is made up of items which are slow-moving. The using departments would be better off if this investment was reduced and additional money invested in fast-moving materials. The more rapid the turnover of stocks the less the cost to the railroad.

Obsolete and unstandard material, when definitely determined to be such, should be disposed of as quickly as possible. It diminishes in value as time goes by, and the expense for storage, handling, accounting, taxes, insurance and interest on investment attaches to its retention. Sometimes material which cannot be used for its original purpose may be adapted to other uses without much expense, even though the possible use for it may not appear off hand. While occasionally some of it may be sold as usable material, most of it will undoubtedly have to be disposed of as scrap. The losses involved will not be

I believe it will be found that the using departments are generally responsible for the presence of obsolete and slow-moving materials. When standards are changed the stores department is not notified and continues to stock material. The same is often true when retirement programs are prepared and carried out, or equipment is transferred. Under these circumstances slow-moving and obsolete materials are found to accumulate and the responsibility must lie with the using departments.

A prominent railroad officer has said that "Information is the essence of operation." The stores department needs timely information as well as other departments, and, given information with respect to changes in standards, assignments and retirements, will be better able to shape its plans to fit the changing conditions.

If the carriage of large stocks of materials would effectively prevent all delays to work on account of material shortages, it would no doubt be economical to carry large stocks, but the fluctuating needs of any railroad create demands which frequently reach outside of any reasonable stock that could be maintained. Naturally, the larger the stock that is carried the greater



The Supply Department Must Avoid Delays to Work in Progress But It Must Also Save the Road from Conditions Like This

lessened by deferring disposition, but the expense of keeping it will certainly continue.

#### Scrap Obsolete Material

The general practice in disposing of obsolete materials is to assign a committee of various using department representatives to condemn and dispose of such materials. This arrangement is a sensible one, but I question its effectiveness in converting all useless material into cash or its equivalent. The judges are not sufficiently disinterested in the effects of this condemnation to do a thorough job because the loss on materials pertaining to their respective departments does not affect their operating results as long as they remain in stock, since that is the stores department business. When losses on obsolete material are realized and accounted for, however, they are charged against the department using such materials. Reluctance to condemn expensive material which might have some color of usefulness in the mind of the department head who would be charged with it if it were scrapped is natural and to be expected; but it probably costs the company a great deal of money. It should be borne in mind that a reduction in store stock of \$1,000 will save the railroad from \$160 to \$250 per annum.

the expense that ensues from obsolescence and from carrying charges. It seems absolutely necessary, therefore, to regulate stocks by the actual demands upon them, this being the first requisite of material control; and to provide the means of meeting the demands expeditiously by storing the material at strategic points.

#### More Study to Prolong Service

The first essential to the control of material stock is a reasonable reduction in the number of the items carried. The following suggestions are offered as aids to stock reductions:

- (I) Better co-operation from the material-using department by
  - (a) Planning production and scheduling shops.
  - (b) The reassignment of locomotives so that the number of mechanical department classes on each division will be reduced to a minimum.
  - (c) Assigning freight car repair work by types or classes to certain shops, thereby avoiding unnecessary duplication of stocks.
  - (d) Studying the designs of equipment and parts and the methods of repair to prolong the serviceability of materials.
- (2) By energetic action by the stores department with the object of
  - (a) Disposing of obsolete materials.
  - (b) Working off surplus accumulations of usable materials.



(c) Recovering from using departments materials not in use and issue in lieu of new stock.

(d) Considering a system of reports from the using departments of unapplied material on hand, with dates of prospective actual needs so that this material may be drawn upon instead of purchasing additional material.

(e) Discouraging the holding or cancelling of orders without the user having knowledge of it.

I am also much in favor of the plan of buying as much as possible on commitments, letting the vendor carry the stock. The practice is finding much favor in outside industries and offers attractive possibilities to the railroads.

#### Good Material Discarded

I have frequently found a disrespect for material and its proper care and conservation. This evil is one which only education will remove. The intrinsic value of the material, the importance of economy in its use, the necessity of avoiding wastes, and the need for proper care to prevent damage, should be kept constantly before employees. As far as it is practicable material should not be left without a keeper, but in addition to keeping materials in responsible charge it is highly important that workmen should be educated to draw only their actual necessities for the job in hand. Workmen generally value their time as being worth more than the material they use, and are inclined to provide themselves with more than an ample supply. There is no patent cure for this condition. The losses to the railroads resulting from this indifferent attitude toward the value of material in the aggregate are large and I believe warrant the attention of all concerned towards its abatement.

Many railroads are doing extensive reclamation work and the savings accomplished thereby are considerable. I had an opportunity not long ago to review a statement showing the effect of operating a large reclamation plant which for the particular month under observation showed savings in excess of \$22,000. These savings were arrived at by charging to the scrap value of the material the cost of labor and material used in reclamation and subtracting this total from the value of similar new material. The portion of the statement that impressed me most was the fact that a substantial portion of the so-called reclaimed material was really material not susceptible to reclamation but was usable material which had found its way into the scrap,—for example, —coil springs, malleable castings, coupler knuckles, brake shoes, flues, track spikes, etc.

I noticed in particular track spikes and track bolts. The only work which can be done on spikes is to straighten the bent ones and the only work on the track bolts would be to clean threads, oil them and apply nuts. This work can usually be done cheaper on the section than in a reclamation plant and would probably have furnished employment on a rainy afternoon for idle section men. Also, if this work had been done on the section, the expense of loading, transporting, unloading, sorting, the reclamation plant overhead and the cost of returning these articles for use would have been avoided. The need is to keep usable material out of the scrap.

#### Shop Order Habits Expensive

Reference is briefly made to the subject of manufacturing in railroad shops. The shop has a right to expect from the stores department the same amount of time for assembling raw materials, completing work and making deliveries as is given the outside manufacturer. Usually raw material such as bar iron, castings, etc., is needed before the manufacturing begins and this raw material, when procured from outside forces, must be

available before manufacture can begin, a fact some stores officers do not seem to recognize.

No matter what particular machine or machines are utilized in manufacturing work there is time lost in getting ready, in procuring drawings, jigs, etc., and in setting up the machine for the work. The larger the order the thinner the spread of this idle time on each piece and consequently the lower is the price. There can be no advantage in ordering few pieces and repeating the order several times in a month when one order could be issued that would save the loss incurred in several set-ups as well as have the effect of reducing interference with shop output. Since most shops are built with the object of repairing equipment rather than manufacturing for stock and since the diversion of repair facilities to manufacturing must cause some interference, the proper course is to handle stock orders so as to cause the least amount of interruption to shop output. This can be done by placing orders on the shop well in advance of the actual requirements, by assembling the raw materials so that the order can be completed at one set-up and by specifying a delivery which will permit the shop management to undertake the manufacture at opportune times.

The railroad problem is complicated, each of its several activities calling for specialization in a high degree. The stores department is no exception to this rule. To carry on its work, serve others better than they can serve themselves, keep the investment in materials at a reasonable figure, and the costs for handling, etc., at a minimum requires ability of a high order. To accomplish most of those aims with material which I feel are of first importance, however, requires no additional plant, no additional expense to themselves or to those they serve. It requires a system or plan carefully fitted to the needs of the particular railroad and governed in all its activities by harmonious co-operation with the using departments.

## I. C. C. Approves Northern Pacific Extension

WASHINGTON, D. C.

**A**S briefly reported in last week's issue, the Interstate Commerce Commission, Division 4, has issued a certificate asked by the Northern Pacific authorizing the construction of an extension in Montana from a point about 2 miles west of Glendive, in a northwesterly direction to Circle, about 50 miles, and thence southwesterly to Brockway, a total of 62 miles, while denying an application filed by the Montana Eastern, a subsidiary of the Great Northern, for authority to build from its present terminus at Richey, Mont., to Circle and Brockway, 45 miles. Each company opposed the application of the other and for a while the Chicago, Milwaukee & St. Paul opposed both applications, but later changed its position by asking that the commission's certificate to either company contain a condition that would permit it to operate over the line from Circle to Brockway in connection with an extension.

Both applicants agreed that the territory to be served would not support two railroads and that only one extension should be constructed, although the Great Northern made a suggestion by which each should build part of the line, and the commission was called upon to decide which of the proposed extensions would best serve the public convenience and necessity.

Circle and Brockway are situated in what is known as



the Redwater country, which takes its name from Redwater river which flows in a northerly direction emptying into the Missouri River near Poplar, on the Great Northern. Glendive is separated from the Redwater country by the Yellowstone divide, sometimes known as the Sheep mountain divide, the summit of which is about 15 miles east of Circle. From Glendive to the summit the ascent is gradual, but west of the summit the descent is more pronounced. The proposed line will extend along Upper Seven Mile Creek for a distance of about 13 miles, and after crossing the divide will follow Buffalo Springs Creek to Redwater river at Circle, thence along that river to Brockway. The working grade for the entire line will be 1 per cent. The line will be constructed with 85 or 90-pound secondhand rail, and will have a maximum rate of curvature not to exceed 8 degrees. The time of construction is estimated at eight months. The estimated cost of construction is \$2,546,556. Service will be afforded daily, except Sunday, by a mixed train.

The Great Northern stressed the contention that, while the Northern Pacific project is strictly a branch line, the proposed extension from Richey to Brockway is part of a projected through line from New Rockford, N. Dak., to Lewistown, Mont., a distance of 555 miles, traversing the large unserved area in east central Montana; that the location surveys through Montana were made in 1910; that construction has been completed between Watford City, N. Dak., and Richey, Mont., and between Snowden and Fairview, Mont., at a cost of \$6,458,000, and that \$4,112,000 has been spent on uncompleted lines, of which \$3,200,000 represents the construction of tunnels and grading between Lewistown and Grass Range, Mont., a distance of 32 miles. It was shown further that certain railroad maps have indicated this through line as a project of the Great Northern for many years. The Great Northern contended that it should be permitted to proceed with the construction of the through line, and stated that if the application of the Northern Pacific is granted the plan will have to be dropped and the expenditure made in uncompleted portions of the proposed line will be lost. It was admitted, however, that no inspection had been made of the work between Lewistown and Grass Range for several years, and that possibly the tunnels may be partly caved in. The Milwaukee has a branch line extending from Lewistown east through Grass Range to Winnett. The Great Northern has a contract with the Milwaukee which provides for the construction by the former of a line from Winnett to the Musselshell River by 1940 or at any time prior to that date on demand, and for joint operation of the line between Grass Range and the river, but such construction by the Great Northern is not compulsory. The testimony showed that the completed portion of the proposed through line of the Great Northern was constructed in accordance with main-line specifications, while the proposed extension from Richey to Brockway is to be constructed according to branch-line standards. It was generally conceded, the commission's report says, that present conditions do not justify the construction of a line east of Lewistown for use as a through line; that such a line could not be supported by through traffic, but would be obliged to depend upon the development of local traffic for support, and that construction will be accomplished by short extensions as the country develops. The Milwaukee, as an intervener, did not oppose granting either application, but asked that any certificate issued in favor of either applicant contain a condition that the Milwaukee be permitted to operate over that portion of the line between Brockway and Circle in connection with any extension of its line which it may undertake in the future from a point on its main line in

the vicinity of Saugus or Terry into the Redwater country. The record showed that most of the traffic from the vicinity of Brockway is shipped from points on the main lines of the Milwaukee and the Northern Pacific between Miles City and Terry, and figures were submitted to show that the Milwaukee would sustain substantial losses of traffic and revenue through the construction of a line to Brockway by either of the applicants. A map submitted by the Milwaukee shows extensions projected by the Great Northern, the Northern Pacific, and the Milwaukee in the east-central Montana area. While the record showed that the Northern Pacific has had no active plans in this area since about 1910, that company stated that if its application is granted it does not propose to terminate permanently at Brockway. The Milwaukee has rather extensive plans for serving the area in question, with which it hopes to proceed after its present difficulties have been adjusted. "In the light of all the facts of record it does not appear that the plans of any particular carrier for serving the east-central Montana area should have any bearing upon the present applications," the commission's report said; "neither does it appear that any rights should be reserved to the Milwaukee upon the assumption that at some future time it may seek entry into the Redwater country. All matters relating to future development should properly be left for determination upon the basis of conditions which may exist at the particular time." The report continues:

The applicants agree that the territory to be served will not support two railroads and that only one extension should be constructed. The question is therefore presented, which of the proposed extensions will best serve the public convenience and necessity? Residents of the Redwater country in the vicinity of Circle and Brockway who appeared at the hearing were practically unanimous in their preference for service by the Northern Pacific on the grounds that such service would enable them to continue their business relations with Glendive, to which point they would have good passenger service, and would give them a short and direct connection with the main line of the Northern Pacific. Residents of the Lindsay district also urged construction of the extension of the Northern Pacific for the reason that it would give them direct service, while the extension of the Great Northern would be of no benefit whatever to them. The principal proponents of the Great Northern extension were the business men of Sidney, Fairview and Williston, who naturally would benefit by the more direct access of those towns to the Redwater country. While the Great Northern insists that the proposed extension would serve the entire Vida country, this contention is not strongly supported by the record. None of the residents of that section appeared at the hearing, and the principal testimony relating to the movement of traffic therefrom was given by the county commissioner of McCone County. He stated that at the present time the town of Vida, which is in the heart of the section, is the dividing line between traffic going north to Wolf Point or Poplar, or southeast to Richey, and that if the proposed extension were constructed the dividing line would probably be about 10 miles further north for the reason that the farmers would rather drive the additional miles than have to depend upon the ferry service.

The Great Northern suggests that the matter be disposed of by the construction of a branch line by the Northern Pacific from Glendive to Lindsay, at a cost of approximately \$672,000, and the construction of its own extension from Richey to Brockway. The Northern Pacific insists that traffic sufficient to support any extension can not be developed unless the lines goes into the Redwater country. The Great Northern offers to permit the Northern Pacific to operate over its line from Newlon Junction to Brockway, which offer is declined by the latter for the obvious reason that after reaching Newlon Junction it would still be 50 miles from its division point at Glendive.

Upon the facts presented we find that the present and future public convenience and necessity require the construction by the Northern Pacific of the extension of its line of railroad in Dawson and McCone Counties, Mont., described in the application. In our opinion the record does not justify the grant of permission to retain excess earnings and such request will be denied. It follows that the application of the Montana Eastern for authority to construct an extension of its line in those counties must be denied. An appropriate certificate and order will be issued. Such certificate will provide that it shall take effect and be in force from and after 30 days from its date.

# Air Brake Association Convention

## *Report of concluding sessions held at Washington— Discussion of freight train handling*

**T**HE Air Brake Association adjourned its thirty-fourth annual convention, which was held at the Mayflower Hotel, Washington, D. C., at noon, Friday, May 27. The final registration showed an attendance of over 1,200 members and guests. The sessions during the last two days were devoted to committee reports on Recommended Practice, Freight Train Handling Instructions, Retaining Valves for Freight Cars, A.R.A. Standard, and to the presentation of a paper on Air Brakes for Automotive Vehicles, by H. D. Hukill, automotive division, Westinghouse Air Brake Company, Wilmerding, Pa.

### **Election of Officers**

The following officers were elected for the year 1927-28: President, H. A. Clark, Soo Lines; first vice-president, H. L. Sandhas, C. R. R. of N. J.; second vice-president, W. W. White, Michigan Central; third vice-president, W. H. Clegg, Canadian National; treasurer, Otto Best, Nathan Manufacturing Company; secretary, T. L. Burton. The executive committee, including the new members, stands: R. M. Long, P. & L. E.; W. F. Peck, B. & O.; C. H. Rawlings, D. & R. G. W.; E. Z. Mann, A. C. L., and E. VonBergen, Illinois Central. The association voted to hold its 1928 convention at Detroit, Mich.

An abstract of the report on freight train handling follows:

### **Freight Train Handling Instructions**

The instructions on freight train handling are divided into three parts. The first portion goes into such detail as should make clear the reasons for any directions given there and later. Good and safe braking can be obtained alone by an understanding use of instructions, not by attempting to follow them blindly. The second part covers the more definite instructions, with additional explanations, on the details of starting, stopping, releasing, steep grade work, etc. The third part covers the caboose air gage, conductor's valve and tail-hose and certain tests that the engineman and trainmen are required to make. The following abstract is confined to the general instructions only:

#### **How to Improve Train Handling**

Good freight train service from the handling standpoint is such that while doing all that is practicable and proper to make time, damage to draft rigging and lading and injury to crews are avoided, and brake-sticking and wheel-sliding are prevented.

Stuck brakes are among the causes for flat and broken wheels; and the causes for the less severe slack action that does minor damage to draft rigging, lading, and persons are largely the same as those that tear out draft rigging, drive in couplers and crush cars. To the extent that the foregoing is realized and opportunities are made use of to learn about and prevent the less severe slack action will the more serious damages be avoided. The engineman who does not ascertain by inquiry what minor troubles are occurring well back from the locomotive and reduce these, will never become efficient in train handling.

While an "old defect" disclosed by a draft rigging failure warrants careful consideration in determining re-

sponsibility for damage done, yet the mere presence of an "old defect" is no proof that there was not inexcusable poor handling or terminal work. An excessive stress must cause failure somewhere, and this failure naturally occurs with the weaker part, yet it may have had ample strength to withstand any reasonable strains.

The men who, by break-in-tows, disclose the most "old defects" are also the ones that are causing the excessive strains and shocks which, while producing no failures, are making what will later be termed "old defects." This will be proved by comparing the records of men in similar service.

Unless the causes and responsibilities for failures are correctly determined, requiring a thorough investigation, an improvement is impossible. If a failure occurred with a weak car near the head end, why was this car not near the rear? If there was an "old defect" that could have been seen in the terminal inspection, why was the car allowed to proceed without repairs? If the train was made unnecessarily difficult to handle by a wrong make-up of loads and empties, why was not the train made up properly? If the foregoing discloses no adequate explanations for it, then it is very probable that wrong handling caused it. Failure to determine and improve these faults indicates the main reason for any excessive monthly damage.

### **Slack Action**

Severe slack action is the cause of much serious and avoidable damage to equipment and lading. Also, it is liable to result in personal injury. Slack action cannot be prevented, but it can usually be so controlled as to avoid doing harm. A careful study and consistent application in service of these instructions will accomplish the desired result.

While it is easily seen how the use of steam or of the engine brakes only will tend to run the slack, it should be as well understood how it is affected by (a) difference in time between the automatic brakes applying and releasing near the ends of a train, (b) by better brake shoe friction at lower speeds, (c) by the same amount of brake application slowing an empty faster than it does a load, (d) by the length and weight of the train, (e) by changes in grade and curvature, and (f) by draft gear spring action. It is by understanding the foregoing and keeping them in mind when handling trains that slack action can usually be so controlled as to do no harm.

### **Effects of Shocks, Stresses and Energy**

There has been apparently a too common belief among those concerned with train handling and including switching that where serious damage is done there should be a severe shock, and that without such a shock no one can be responsible for the damage. This is entirely wrong, for where the most serious damage is done, as when good-order draft rigging is driven in or pulled out and where a car is crushed, there is usually an insignificant shock where the damage occurs and none far from it, as at the engine or the caboose.

Therefore, it should be distinctly understood that the absence of any considerable shock where damage is done in train handling and switching does not in the least remove or lessen responsibility for the damage. The



greater damage proves the existence of a greater force. The important questions are: What caused it? Could it have been prevented? and, if so, how? If these questions are not answered satisfactorily, similar damage will continue to occur.

The cause for a crushed car has too generally been a mystery to all concerned, yet it is the same thing, merely magnified, that causes a broken knuckle or other minor damage and has no direct relation to shocks. Strange as it may seem, there are certain conditions that increase the shock and lessen the liability of damage.

It has seemed to be a too common impression that if a man takes a train over a division without a break-in-two it is indicative of good handling, irrespective of any severe stresses imposed on draft rigging, and which may or may not be accompanied by shocks. Every bending of a draft bolt, rivet, or knuckle pin and cracking of a draft timber means failure later from a stress that, without such abuse, would have caused no failure.

The work to be done by the brake in stopping a train from faster speeds is far greater than the increases in speeds; and the work to be done in either stopping a train or preventing it from gaining in speed is increased directly with the amount its weight is increased by the lading. On the other hand, the work the brake can do over the same distance in either stopping the train or in preventing it from gaining in speed is very much less at higher speeds because of the poorer brake shoe friction or holding power developed by the same brake shoe pressure. Also, the retarding power available for stopping is much less down a grade because part of the total developed is required merely to prevent an increase in speed. Strong as these arguments are in favor of moderate speeds, and particularly down grades, there is still another one. Compressed air finds any and every opening to leak back to the atmosphere. As it is impossible to keep all brake cylinders air tight it follows that the longer the distance and time required for stopping, the more will be the loss by leakage of the brake cylinder pressure that is producing the holding power, thus further increasing the stopping distance.

#### Train Make-up

The difficulty in handling a train without damage can be considerably affected by the train make-up. That the majority of damaging shocks and stresses occur near the head end is proved by a tabulation of over one thousand break-in-two records showing that about 40 per cent of these break-in-tuos occurred within ten cars of the engine. Therefore, the car with a weak design of draft rigging or with a good design that has been weakened by service should be put near the rear end.

All loads ahead of the empties decrease the tendency of slack to run in when a brake pipe reduction is begun and increase the tendency of the slack to run out when the reduction is completed. Reversing this make-up reverses these tendencies. Either slack action will do damage if severe, but that from the slack run-in is by far the more dangerous because of tending to crush cars.

Therefore, a train of loads and empties should never have the loads behind the empties, never have more than half of the loads in the rear half of the train, and even then the majority of the loads should be well toward the forward end of each half. The ideal arrangement would be to alternate the loads and empties, but this would be impracticable. Therefore, where the difficulty of handling a train of loads and empties warrant more care in make-up, place as many empties ahead of the loads as there are loads in the train, but not exceeding one-half of the empties. That is, if the number of loads is equal to or exceeds one-half of the empties, place one-half of

the empties ahead of the loads and the other half behind the loads.

The report was signed by J. P. Stewart, (M. P.), chairman; G. H. Wood, (A. T. & S. F.), W. H. Davies, (Wabash), C. H. Rawlings, (D. & R. G. W.), W. H. Clegg, (C. N.), M. Purcell, (N. P.), E. Z. Mann, (A. C. L.), C. H. Weaver, (N. Y. C.), J. W. Walker, (Penna.), H. L. Sandhas, (C. R. R. of N. J.), F. B. Johnson, (Westinghouse Air Brake Co.), F. B. Farmer, (Westinghouse Air Brake Co.), C. B. Miles, (C. C. C. & St. L.), and E. F. Wentworth, (New York Air Brake Co.)

## Hearings in Firemen's Arbitration Concluded

WASHINGTON, D. C.

THE hearing before a board of arbitration on the wage increase asked by the Brotherhood of Locomotive Firemen and Enginemen for firemen and hostlers on eleven southeastern railroads, which had been in progress since May 17, was brought to a close on June 1 after oral argument by counsel for the railroads and the brotherhood. The arbitration agreement had provided that a decision should be rendered within 30 days from the opening of the hearing but by agreement this was extended for another ten days to June 27. The arguments were made by W. A. Northcut, representing the roads, and Donald R. Richberg, representing the employees.

The hearing has been somewhat different from other similar proceedings. Because the railroads made no claim of inability to pay the case has not been complicated by controversies as to the prosperity or lack of it of the companies involved nor as to the merits of book-keeping or other surpluses and similar questions. The testimony has been closely confined to the main questions as to the work done by a fireman and the wages he receives or should receive for the work, although some testimony regarding the increased earnings of the railroads was put into the record on May 24 by Frank J. Warne, the last witness for the brotherhood.

Testimony on behalf of the brotherhood was concluded on May 24 and that on behalf of the railroads was begun on May 25 and concluded on May 26. Whereas the Brotherhood seeks to justify higher wage rates by comparisons with union wage scales in other classes of employment and by statistics and other testimony regarding the arduous work of the fireman, the hazards of the employment and his greater responsibility on the larger and more powerful locomotives and in connection with the improvements in the way of additional devices with which they are equipped, the railroads took the position that the present wage rates are high in relation to the service performed and that the use of larger locomotives has increased the wage rates, while the modern equipment has reduced the labor. One railroad witness said the fireman's work has "evolved from a job to a position."

As against the testimony offered by the Brotherhood based on schedule rates the railroads emphasized the earnings of the men and the rates actually paid on the classes of engines most generally used, pointing out that they have been automatically increased, because of the classification by weight on drivers by the introduction of heavier power; and whereas the brotherhood has asked for additional classifications and an increase of \$1.25 a day for the heavier locomotives, they have shown that



stokers and other equipment have lessened the work of the men employed on the more modern engines. The increase asked is \$1.00 a day for locomotives up to 250,000 pounds on drivers and an additional increase of 25 cents a day for each additional 50,000 pounds.

#### Heavier Locomotives Have Stokers

F. W. Brown, assistant to the general manager of the Atlantic Coast Line, the first witness for the roads, submitted exhibits relating the basic rates of pay to the 4,463 locomotives actually in service on December 16. He showed, for example, that in passenger service, while the rates range from \$4.56 to \$5.76, the largest number of locomotives in service was in the class of 100,000 to 140,000 pounds, with comparatively few taking the minimum rate, and that of those above 170,000 pounds 41.9 per cent were equipped with mechanical stokers. In through freight service the rates range from \$5 to \$6.51, but the lower rates practically do not exist and of the locomotives above 170,000 pounds 74.5 per cent were equipped with stokers. In local freight service the rates range from \$5.40 to \$6.44 and \$6.91 for Mallets, and of the engines above 200,000 pounds 55.2 per cent were stoker-fired. In yard service the rates range from \$5.28 to \$5.68 and \$6.64 for Mallets, and of the locomotives over 300,000 pounds 83.5 per cent were stoker equipped.

In local freight service, Mr. Brown showed, of over 500 locomotives, 27 paid the lowest class rate, 12 the next class rate, 189 a rate of \$5.64; 229 paid \$5.80; 93 paid \$5.96; 42 paid \$6.12; 6 paid \$6.28; 4 paid \$6.44, while 6 Mallets paid \$6.91 for a basic day. The 11 roads owned 5,377 locomotives, including 16 electric and 507 Mallets.

In 1917, Mr. Brown said, only about one-third as many stokers were in service as in 1926 and at the time when the classification of rates based on weight on drivers was adopted a large proportion of the locomotives were hand-fired. He had an exhibit covering the increase in the pay of firemen brought about by the gradual introduction of heavier power, without reference to the successive wage increases that have been made, showing that had there been no increase in rates since 1919 the increased weights of the engines would have automatically increased the average rates of all men in through freight service 19 cents a day or 4 per cent; in all freight service 9 cents a day or 2 per cent, and in all service 8 cents a day or 1.8 per cent.

In 1919, Mr. Brown said, 62 per cent of the engines on the 11 roads were less than 170,000 pounds on drivers, whereas, in 1926, 71 per cent were over 170,000 pounds and the firemen on them received the higher rates of \$5.56 to \$6.04. Another exhibit compared the increases in wages received by the firemen with those of other classes of trainmen, showing, for example, that the average rate paid firemen in passenger service, \$4.78 for 100 miles or less or eight hours or less, would produce on runs of 150 miles or over earnings substantially greater than those of the conductor.

#### Labor Saving Devices

Testimony was also given as to the improvements and devices which have been adopted to increase the steaming ability of the locomotive or reduce the labor of the firemen, such as stokers, superheaters, automatic firedoors, feedwater heaters, power grate shakers, table grates, wide fireboxes, brick arches, electrically-welded flues, automatic bell-ringers and boosters. In 1917, Mr. Brown said, 117 locomotives other than Mallets had stokers and in 1926 there were 701 so equipped. In 1917 there were 327 Mallets with stokers and in 1926 there were 604. In 1926, of those from 250,000 to 300,000 pounds, 91.5 per

cent were equipped with stokers, while in the next lower class 56.7 per cent were so equipped. Of all locomotives used in 1926, 24.3 per cent had stokers, 55.5 per cent had superheaters, and 64.6 per cent had automatic firedoors.

In the four months from October to December, 1926, according to another exhibit, stoker-fired engines on the eleven roads made 138,569 trips and on only 244 trips was there a failure for any cause in connection with the stoker which would require the fireman to fire by hand to the terminal. This would be once for each 568 trips or once in 28 months for a fireman, based on average conditions.

H. F. Henson, road foreman of engines on the Norfolk & Western, testified regarding the operation of stokers to show that it is much easier to fire a stoker-fired engine than to fire by hand. He said the coal is prepared in advance, so that it need not be broken up, and that the occasions when the stoker requires special attention are few and involve little trouble or skill. He said that it takes only a week or ten days for a beginner to qualify as a fireman and take a regular run at regular pay, and, while he would not consider a man a good fireman until he had had at least six months' experience, he said that the expense due to lack of experience or trouble is an expense to the railroad rather than to the man. With a stoker, Mr. Henson said, the fireman does 85 per cent of his work from the seat-box, and he saw no reason for any of the mental strain described by witnesses for the Brotherhood. He said a fireman can eat his lunch on the heaviest locomotive while it is being worked to capacity, and he often does not have to touch the stoker for miles and miles.

L. W. Pulliam, traveling locomotive engineer on the Louisville & Nashville, said that during his 6½ years as a fireman his weight increased from 140 to 170 pounds and that, as compared with the time when he was firing, the work has been reduced from 50 to 75 per cent, largely as the result of new devices, so that the work has "evolved from a job to a position." He said that in instructing firemen in the use of the stoker he customarily rides with them "cubbing" for 25 miles and "then we turn him loose and never hear from him any more."

Referring to the testimony of a fireman who had said that he was burning from 12 to 14 and 15 tons of coal per trip, Mr. Pulliam said that he was either a "coal shoveler" as distinguished from a "fireman," or else he does not know how to estimate coal, because tests on the same locomotive had shown that 7½ tons was enough for the trip.

R. J. Turnbull, assistant to the general superintendent of motive power of the Atlantic Coast Line, testified regarding the functions of superheaters, electrically-welded flues and wide fireboxes, which, he said, reduce coal consumption, eliminate trouble from leaky flues and improve combustion without adding particularly to the labor of the firemen, but increasing the efficiency of the engine. Superheaters, he said, reduce coal consumption 22 to 30 per cent.

J. S. Maston, road foreman of engines on the Norfolk & Western, testified regarding the work of helpers on electric locomotives, saying that this class of service is generally considered more desirable and easier than firing a steam locomotive. Referring to previous testimony as to the large number of things firemen on steam or electric locomotives are expected to learn, he said that most of these are for the purpose of qualifying them for promotion to engineers rather than pertaining to their duties as firemen or helpers. If a locomotive is equipped with stokers, he said, it makes no difference to the firemen whether it weighs 100,000 pounds or 500,000.

Exhibits showing the range of earnings of all men

who worked as firemen during the first six months of 1926 on the 11 roads involved in the arbitration were introduced on May 26 by F. W. Brown, assistant to the general manager of the Atlantic Coast Line. The figures included certain earnings by firemen who performed some service as engineers, but excluded those whose earnings as engineers predominated. The principal exhibit also omitted 2,668 men who, due to irregularity of service or other causes, earned an average of less than \$100 a month. Their average was \$39 a month, for an average of 5.2 trips or days.

The average earnings of all firemen in road and yard service, 6,001 men, excluding hostlers, were \$170.18 per month, for an average of 22.7 trips or days. Of these 11.1 per cent received from \$100 to \$125; 18.8 per cent received \$125 to \$150; 27 per cent received \$150 to \$175; 21.8 per cent received from \$175 to \$200; 15 per cent received from \$200 to \$225, and 6.3 per cent received over \$225. The average per day or trip was \$7.50, including \$6.31 straight time, \$1.05 overtime, and 14 cents other payments, including arbitrations. The 2,668 men also averaged \$7.48 for each trip made.

In road service alone the average earnings were \$176.16 for 22 trips (or days); in passenger service, \$193.05 for 26.5 trips; through freight service, \$168.44 for 20.5 trips; local freight service, \$184.18 for 21.4 trips; mine run service, \$173.86 for 21.2 trips; helper service, \$165 for 24.1 trips; and yard service, \$151.24 for 25 days. Outside hostlers averaged \$168.15 for 27.1 trips or days and inside hostlers averaged \$147.56 for 26.7 trips or days.

Under the agreements between the roads and the Brotherhood, Mr. Brown said, there are in effect mileage restrictions that require a man to stop work after having made 4,800 miles or its equivalent in a month, and he gave several specific examples of men earning over \$200 a month who could have earned from \$247 to \$314 if not required to lay off by the mileage restriction. One man earning \$229.95 in a month could have earned \$314.60 by working 26 days, and another earning \$239.32 for 120 hours could have earned \$308.76.

Mr. Brown also filed an exhibit showing that from 1917 to 1923 the average tractive power of the locomotives on the 11 roads increased 4,300 pounds or about 10 per cent and from 1923 to 1926 it increased 4,500 pounds or another 10 per cent, making a total increase of 21 per cent.

Another exhibit showed the total net expenditures for ten years charged to selected capital accounts for the 11 roads. This included 90,233,606 for locomotives. During the period 2,217 new locomotives were installed, a net increase of 840.

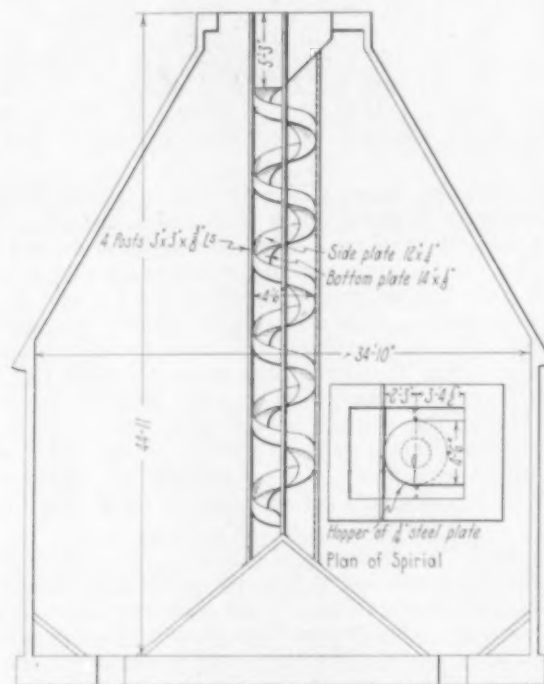
The railroad presentation was concluded on May 26 and an adjournment was taken to May 31, when D. B. Robertson, president of the Brotherhood of Locomotive Firemen and Enginemen, testified in rebuttal, saying that practically no locomotives are equipped with stokers that can be operated efficiently by hand and that he found no evidence that stokers have been applied to lighten the labors of firemen. "On the contrary," he said, "locomotives imposing excessive labors on firemen are still largely employed and the locomotives stoker-equipped are those wherein the service of the fireman is of greatly increased value to the railroads because of the larger tractive power and increased tonnage rating of these locomotives." Mr. Robertson also introduced additional statistical evidence relating to exhibits introduced by the railroad witnesses. He said he had heard railway officials refer to the modern locomotive as having "more jewelry" hanging on it than the ordinary locomotive and that it requires more attention and that "it certainly goes without saying that worries

make work on a railroad and I think there are more worries for a man with all the later mechanical contrivances to look after on an engine than there were with the old locomotives, even though they were all fired by hand."

## M-K-T Reduces Coal Breakage

**M**ECHANICAL coaling stations have sometimes been subjected to the criticism that the discharge of the coal into the bin from the hopper at the top results in excessive breakage and in the segregation of the slack, especially when the bin is nearly empty and the coal must drop a considerable distance. Studies to overcome this in the coaling station recently completed for the Missouri-Kansas-Texas in the new Ray terminal at Denison, Texas, resulted in the installation of a spiral chute in the center of the cylindrical storage bin, as shown in the sketch.

As is seen, the chute is 4 ft. 6 in. in diameter and extends from the bottom of the bin to the discharge hopper at the top. It is made of steel plates supported by four angle iron posts. The bottom of the spiral chute con-



Section Through the Coaling Station Showing the Spiral Chute in Position

sists of a plate 14 in. wide with a side plate 12 in. high secured to its outer edge. However, there is no side plate or curb at the inner edge of the bottom plate, so that the coal is free to drop through the 26-in. opening down the center of the spiral whenever it is not forced to the outer circumference by the centrifugal force set up when the coal is in motion down the chute. The pitch of the spiral is 8.2 in. per ft. at the inner edge of the bottom plate and 4.7 in. per ft. at the outer edge.

When the bin is empty the coal dropped into the hopper slides down the full length of the chute. As the bin fills up and the coal is brought to a stop at any point in the height of the spiral chute, it flows out through the 26-in. opening in the center or over the 12-in. side plate and slides down the cone of the coal pile to the sides.



The coaling station at Denison is a 630-ton reinforced concrete structure built by the Roberts & Schaefer Company, Chicago, and is equipped with an automatic electric Simplex roller-skip type of hoist and a 15-ton scale to weigh and record the coal issued to locomotives. The spiral chute was furnished by the Anthracite Separator Company, Hazleton, Pa. The new coaling station and a three-track N. & W. type cinder plant built under the same contract as well as necessary track changes, repre-



The New Coal and Sand Facilities at Denison, Texas

sent an investment of \$67,000 for new facilities at that point. A coaling station of the same type and similarly equipped has been erected for the Missouri-Kansas-Texas at Bartlesville, Okla.

We are indebted for the above information to F. Ringer, chief engineer, Missouri-Kansas-Texas, St. Louis, Mo.

## Reviews Year to Date

THE directors of the American Railway Association at a meeting in Atlantic City, on May 26, approved a report submitted by the car service division in which it was stated that as efficiency in the use of freight cars is now the greatest ever attained the car service division believes that it is possible to handle the traffic of this country for some time to come with a total decrease in the ownership of open top and box cars of at least 100,000. This is possible, provided:

- (1) That there be a continuation of the replacement of the smaller capacity and less efficient cars with cars of modern type.
- (2) That there be a continuation of the present plan of maintaining equipment at the highest practicable point, as determined by the necessities on the individual roads.
- (3) That there be a further increase in the miles per car per day of at least one mile.
- (4) That further intensive consideration of the load per car be given by railway management and by all the shippers' regional advisory boards with a view of increasing tons per car to the greatest possible extent and not less than average of one ton per car:
  - (a) By the receivers wherever practicable buying in carload rather than specified quantities;
  - (b) By careful check on the part of shippers to load cars to their maximum carrying capacity where they are not limited by the receivers' requirements.

(5) That there be careful supervision on the part of industries as to loading and unloading of cars with a view of making a reduction of at least 20 per cent in the amount of demurrage assessed during the year 1926.

Continuing, the report says: Never in history were the railroads in better condition to meet the heavy transportation demands of the shippers of this country than they are this year. The placing in service of 602,507 modern high capacity cars, either new or rebuilt, the retirement from service of 545,238 low capacity, inefficient cars, and also the placing in service of 10,862 locomotives since January 1, 1923, has without doubt been the principal outstanding cause of this increased efficiency.

Of freight cars, the average capacity today is 45.33 tons compared with 44.87 tons last year and 43.10 tons in 1923. The average tractive power of locomotives is now about ten per cent greater than in 1923 but their coal consumption is less. Fewer freight cars and locomotives now are in need of repair than at this season in any previous years.

There has been a better distribution of cars, due to a continually increasing co-operative effort on the part of carriers. Not only has the volume of freight traffic been the greatest during the first four months this year for any corresponding period on record, but freight shipments have been and are being handled by the rail carriers with the greatest dispatch on record. The improved condition of railway equipment has played a substantial part in expediting the movement of freight. The average turnaround in 1926 for active car units in service, excluding cars awaiting repairs and surplus, was 14.7 days as compared with 16.1 days in 1923.

The Car Service Division estimates the revenue freight loading for the 52 weeks of 1927 as 52,762,737 carloads compared with 53,308,753 carloads in 1926 or a decrease of 546,016 carloads. This decrease is due principally to the exceptionally heavy movement of export coal to England in 1926 and the curtailed output of bituminous coal in 1927 due to large stocks on hand on April 1 in anticipation of stoppage of mining in union fields. In making this estimate no consideration has been given to the possible effects of the Mississippi River flood on the total carloadings of the year.

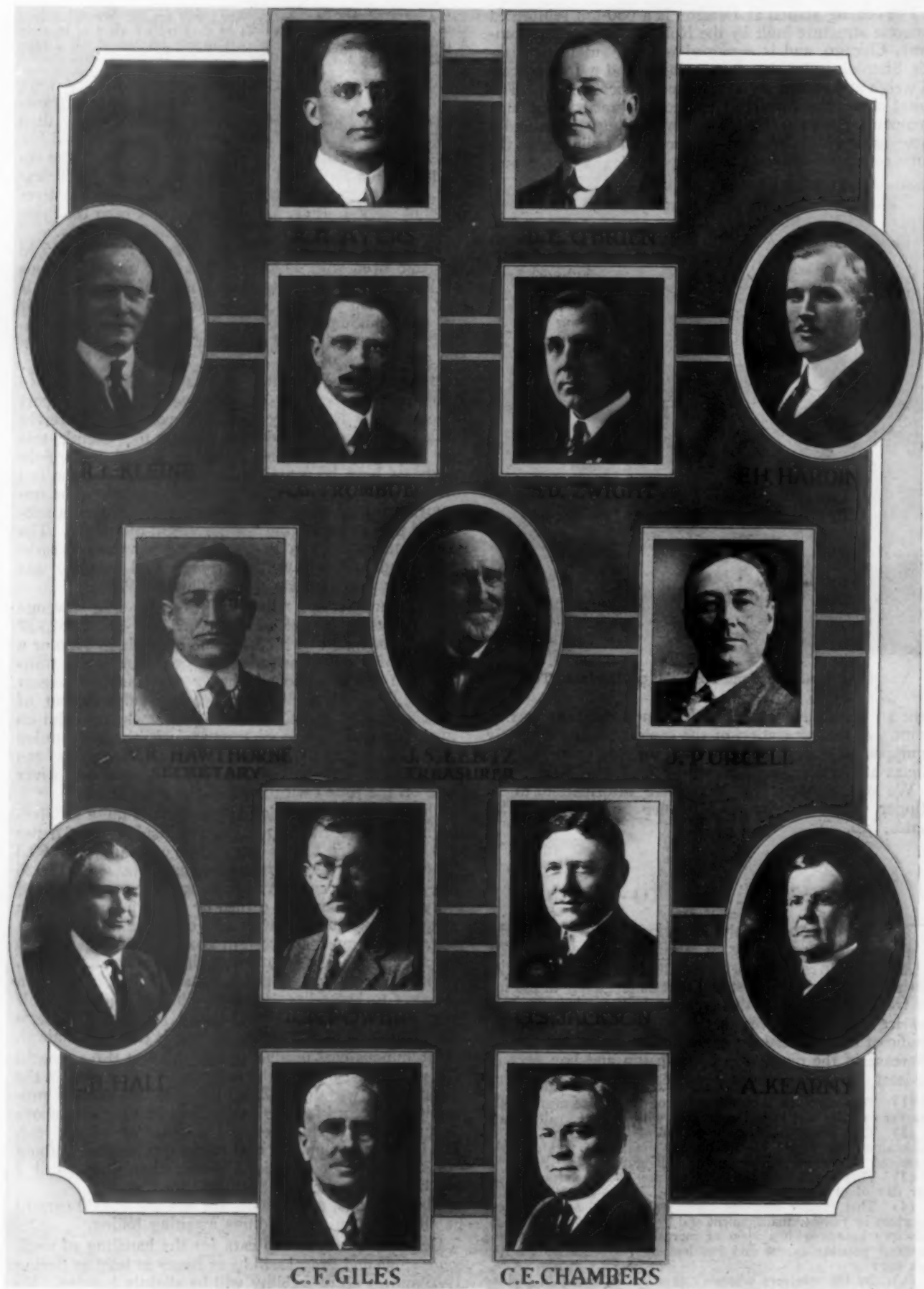
The box car distribution at this time is quite satisfactory. As of April 15, the western roads had 93.8 per cent of ownership of box cars on line compared with 90.3 per cent a year ago, representing an increase of 11,126 cars or 2.7 per cent. As of the same date, 642 out of every thousand box cars owned by western lines were on home roads, compared with 625 cars per thousand last year. The number of western box cars on eastern lines was the lowest ever recorded at this season of the year. There has been maintained a constant flow of western box cars to home lines through Chicago and St. Louis from eastern territory, this being a fundamental necessity if the box car supply in the west is to be maintained.

Bituminous coal production for the first three months this year, intensified by the anticipated suspension in the union fields, was 169,967,000 net tons, the highest production on record for this period, and 16.1 per cent above the production during the corresponding period last year. The increased volume of coal traffic was handled without car shortage or congestion. Production since April 1 has been approximately 8,000,000 tons weekly.

The railroads, as a whole, are holding 26,000 cars of unbilled coal on mine sidings awaiting billing.

Demands for open top cars for the handling of steel, sand, stone and gravel will be as heavy at least as during 1926 and in all probability will be slightly heavier. No difficulty is anticipated in handling the 1927 open top car requirements. There has been an ample supply of refrigerator cars at all times.





General Committee, Mechanical Division, American Railway Association

# Mechanical Division to Meet at Montreal

*An unusually strong and comprehensive program has been prepared for the four-day convention*

THE Mechanical Division of the American Railway Association will hold its eighth annual meeting at Montreal, Quebec, June 7-10, inclusive. Two sessions each will be held on the first three days, beginning at 9:30 a.m., and adjourning at 5:00 p.m. Only one session will be held on the last day, Friday; it will start at 9:30 a.m. and adjourn at 12:30 p.m.

Never before has the Mechanical Division or either one of its predecessors, the American Railway Master

vice-chairman of the Division is a Canadian, and also because this year marks the sixtieth anniversary of the Confederation into a united Dominion. Incidentally, the chairman of the Division, Mr. Sillcox, was also at one time associated with a Canadian railway. Undoubtedly these things inspired the cordial and hearty invitations from the heads of the two great Canadian railroads, E. W. Beatty and Sir Henry W. Thornton, to the American Railway Association, to hold the Mechanical Division meeting in Canada this year—the first and only



Moffett Studio.

L. K. Sillcox  
Chairman, Mechanical Division, A. R. A.



G. E. Smart  
Vice-Chairman, Mechanical Division, A. R. A.

Mechanics' Association, or the Master Car Builders' Association, held a meeting outside of the United States, although not a few meetings of the older associations were held at Saratoga Springs and Niagara Falls, within easy reach of the Canadian border. It is significant that throughout the entire history of these organizations no line has been drawn between representatives from these two countries. For one thing, this was due to the fact that the operation of railroads in the two countries is so closely related and interwoven, and also because of the interchange of many mechanical department officers between the railroads of the two countries.

It is quite appropriate, therefore, that the Mechanical Division should hold an occasional meeting in Canada, and it is particularly appropriate at this time because the

time in the 60-year existence of the mechanical associations.

The career of the Mechanical Division and its predecessors has been somewhat checkered in recent years. For a great many years prior to 1917 it was the custom to hold an exhibit under the direction of the Railway Supply Manufacturers' Association, in conjunction with the annual meetings of the Master Mechanics' and Master Car Builders' Associations. All preparations had been made for a big meeting in June, 1917, but it was cancelled almost at the last minute by the entry of this country into the World War in April of that year.

In June, 1918, the fifty-first annual meeting of the Master Car Builders and the fiftieth annual meeting of the American Railway Master Mechanics' Association

were compressed into a joint two-day meeting at Chicago, the attendance being limited to the executive committees and representative members of these two associations.

In June, 1919, the first meeting of the Mechanical Division was accompanied by a record-breaking exhibit at Atlantic City, the Master Mechanics' and the Master Car Builders' Associations having been merged into the Mechanical Division a few months before. In the following year, 1920, the second annual meeting of the Division was again accompanied by an exhibit.

Because of the business depression in 1921, the Railway Supply Manufacturers' Association decided not to make an exhibit, and the Mechanical Division scheduled a two-day business session at Chicago. On June 10, only a few days before the meeting was to be held, it was postponed until later in the month, but was finally cancelled entirely "in view of the imperative need for the exercise of all possible economy."

In the even years since that time, 1922, 1924 and 1926, the conventions have been held at Atlantic City in conjunction with exhibits that have grown larger and larger each year. In the odd years, 1923 and 1925, three-day meetings were held at Chicago. The attendance was limited and supply manufacturers' representatives were not expected to attend. Two years ago, however, an effort was made to secure a larger attendance of railway men and to broaden and enlarge the program.

This year a special effort has been made to prepare a comprehensive and strong program, which it is expected will attract an unusually large number of railway men and others who are interested in mechanical department progress. The four-day program, with an exceptional group of committee reports and individual papers, most of which reached the members in time to be read in advance, should form the basis for a most constructive and productive discussion.

The number of special papers and addresses is noteworthy and reflects the determined effort which has been made to secure the co-operation of the very best authorities on highly technical topics as well as on the broader aspects of railroading concerning which it is important that the mechanical department should be informed.

#### General Committee

The personnel of the General Committee is as follows: L. K. Sillcox, chairman, general superintendent motive power, Chicago, Milwaukee & St. Paul; G. E. Smart, vice-chairman, chief of car equipment, Canadian National; A. R. Ayers, assistant general manager, New York, Chicago & St. Louis; C. E. Chambers, superintendent motive power and equipment, Central Railroad of New Jersey; C. F. Giles, superintendent machinery, Louisville & Nashville; E. B. Hall, superintendent motive power and machinery, Chicago & Northwestern; F. H. Hardin, assistant to president, New York Central Lines; O. S. Jackson, superintendent motive power and machinery, Union Pacific; A. Kearney, superintendent motive power, Norfolk & Western; R. L. Kleine, assistant chief of motive power, Pennsylvania Lines; J. S. Lentz, master car builder, Lehigh Valley; J. E. O'Brien, chief of motive power and equipment, Seaboard Air Line; J. A. Power, superintendent motive power and equipment, Southern Pacific Lines; John Purcell, assistant to vice-president, Atchison, Topeka & Santa Fe; A. G. Trumbull, chief mechanical engineer, Erie; and Silas Zwight, general mechanical superintendent, Northern Pacific.

V. R. Hawthorne is secretary of the Division and of the General Committee. During the year a change in personnel of the General Committee was caused by the death of W. H. Fetner, chief mechanical officer of the

Missouri Pacific; he was succeeded by A. G. Trumbull. J. T. Wallis of the Pennsylvania withdrew from the General Committee after his appointment as assistant vice-president of operation, and was succeeded by R. L. Kleine.

The General Committee is responsible for conducting the affairs of the Division between meetings and the preparation of the program for the annual meetings. It is to be most sincerely congratulated upon the program which it has prepared for the Montreal meeting.

#### The Chairman, L. K. Sillcox

L. K. Sillcox, chairman of the Mechanical Division, and general superintendent motive power of the Chicago, Milwaukee & St. Paul, is a comparatively young man for such a position. A friend who has followed his progress closely says: "Mr. Sillcox is a very lovable fellow and a man who would stay up all night to help anyone that would ask him for help. He is broad-minded, energetic, and possesses, I feel, all the qualifications for a first-class executive."

Another friend, who has known him intimately from his college days, has said: "In dealing with his men he has always kept in mind the future, and he has been doing everything within his power to construct and build an organization in his department that would improve with age and that would function with greater efficiency year by year. He has not hesitated to express his belief in young men and has shown his confidence by taking many young men and giving them the proper sort of training to enable them to be placed in positions of trust."

A further estimate of Mr. Sillcox's ability is afforded in the following testimony of Mark W. Potter, given on July 27, 1926, before the I. C. C., docket 17021:

Q. Do you look for the repairs to freight cars to increase or decrease materially in the near future?

A. I should look for a gradual decrease, but not a very important decrease; a gradual decrease, because of the better conditions of our power and because of the gradual improvement in the machinery to work with. We have, I think, a mechanical department as fine as anything in the United States. I have had, during recent years, several opportunities on occasions to consider what was being done by mechanical departments of carriers of this country, and without saying a word in disparagement of anyone else, it is a pleasure for me to say that I never have met anyone anywhere who so impressed me as a competent man and a man of good sense, alert, cautious, conscientious, as does Mr. Sillcox, our general superintendent of motive power. He is doing wonderful work, but he is up against an awful job with the tools he has to work with and the equipment he had to take hold of. He has been on the job since he came with the company shortly before 1920, and he has been in charge of power for three or four years. He is a star, and the work today compares not unfavorably with the work now being done on other western lines, which are better equipped with facilities than he is.

Lewis Ketcham Sillcox was born April 30, 1886, at Germantown, Pa. He was graduated from Trinity School, New York, 1901, and the Polytechnic School of the University of Brussels, Belgium, 1903. He entered railway service, July, 1903, as roundhouse apprentice for the New York Central & Hudson River at High Bridge, N. Y.; 1906 to 1909 he was molder and assistant superintendent, McSherry Manufacturing Company, Middletown, Ohio; 1909 to 1912, shop engineer, Canadian Car & Foundry Company at Montreal; 1912 to 1916, mechanical engineer, Canadian Northern Railway System at Toronto, Ont.; 1916 to 1918, mechanical engineer, Illinois Central; 1918 to June 1, 1920, master car builder, Chicago, Milwaukee & St. Paul at Milwaukee, Wis.; June 1, 1920, to August, 1920, assistant general superintendent motive power of the same road at Chicago; August, 1920, to date, general superintendent motive power at Chicago.



### Vice-Chairman G. E. Smart

G. E. Smart, vice-chairman of the Mechanical Division and chief of car equipment of the Canadian National is, like Mr. Silcox, representative of the younger group on the General Committee. He was one of the charter members of the Canadian Railway Club and at one time served as its president. He became a member of the Master Car Builders' Association in 1910 and was elected a member of the General Committee of the Mechanical Division in 1924.

Mr. Smart was born in Edinburgh, Scotland. His entire railroad career has been on Canadian railways. He entered railroad service in the car department of the Grand Trunk in 1892 and in 1904 went with the Canadian Pacific. He was appointed master car builder for the Canadian Government Railways in 1913 and in 1919 was made general master car builder of the Canadian National. Shortly afterwards he was made mechanical assistant to the vice-president, and in 1923 was appointed to his present position—chief of car equipment.

### The Program

The program of the eighth annual meeting of the Mechanical Division of the American Railway Association follows:

**Tuesday, June 7, 1927**

**9:30 A. M. to 5:00 P. M.**

Invocation: Canon Shatford, Church of St. James the Apostle, Church of England.

Welcome: Mayor Martin of the City of Montreal.

Address: The Right Honorable George P. Graham, P. C.  
Address: R. H. Aishton, president, American Railway Association.

Address: "The Man Problem," Samuel O. Dunn, editor, *Railway Age*.

Address: By the chairman of the Mechanical Division, L. K. Silcox, general superintendent motive power, Chicago, Milwaukee & St. Paul.

Action on minutes of annual meeting of 1926.

Appointment of committees on Subjects, Resolutions, Correspondence, etc.

Unfinished business.

New business.

Report of General Committee.

Discussion of reports on: Nominations, Design of Shops and Terminals, Couplers and Draft Gears, Specifications and Tests for Materials, Brakes and Brake Equipment (including paper on "Methods of Avoiding Slid Flat Wheels"), Wheels, Lubrication of Cars and Locomotives.

**Wednesday, June 8, 1927**

**9:30 A. M. to 5:00 P. M.**

Address: By Interstate Commerce Commissioner, Hon. Frank M. McManamy.

Address: M. J. Gormley, chairman, Car Service Division, American Railway Association.

Individual paper: "Trends in Engineering Education," by A. A. Potter, Dean of Engineering, Purdue University.

Individual paper: "Railway Motor Transport with Particular Reference to the Mechanical Problems," by F. J. Swentzel, mechanical superintendent, New England Transportation Company.

Discussion of report on Automotive Rolling Stock.

Individual paper: "Passenger and Freight Car Design," by V. Willoughby, general mechanical engineer, American Car & Foundry Company.

Discussion of reports on: Car Construction, Arbitration, Prices for Labor and Materials, Tank Cars, Loading Rules, Safety Appliances (including report from H. A. Johnson, Director of Research).

**Thursday, June 9, 1927**

**9:30 A. M. to 5:00 P. M.**

Address: A. G. Pack, chief inspector, Bureau of Locomotive Inspection, Interstate Commerce Commission.

Individual paper: "The Relation of the Physical Factors to the Financial Results of Railway Operation," by W. T. Jackman, professor of political economy, University of Toronto.

Individual paper: "The Present Status of the Oil Engine Locomotive," by A. I. Lipetz, consulting engineer, American Locomotive Company.

Discussion of reports on: Locomotive and Car Lighting, Locomotive Design and Construction.

Individual papers: "What Is Left That Has Not Been Done to Attain the Maximum Theoretical Return from the Steam Locomotive."

"From the Standpoint of Traction," by W. H. Winterrowd, vice-president, Lima Locomotive Works.

"From the Standpoint of Combustion," by L. H. Fry, Baldwin Locomotive Works.

"A Look Into the Future," by Prof. A. J. Wood, Pennsylvania State College.

"Passenger Car Construction," by G. E. Smart, chief of car equipment, Canadian National Railways.

**Friday, June 10, 1927**

**9:30 A. M. to 12:30 P. M.**

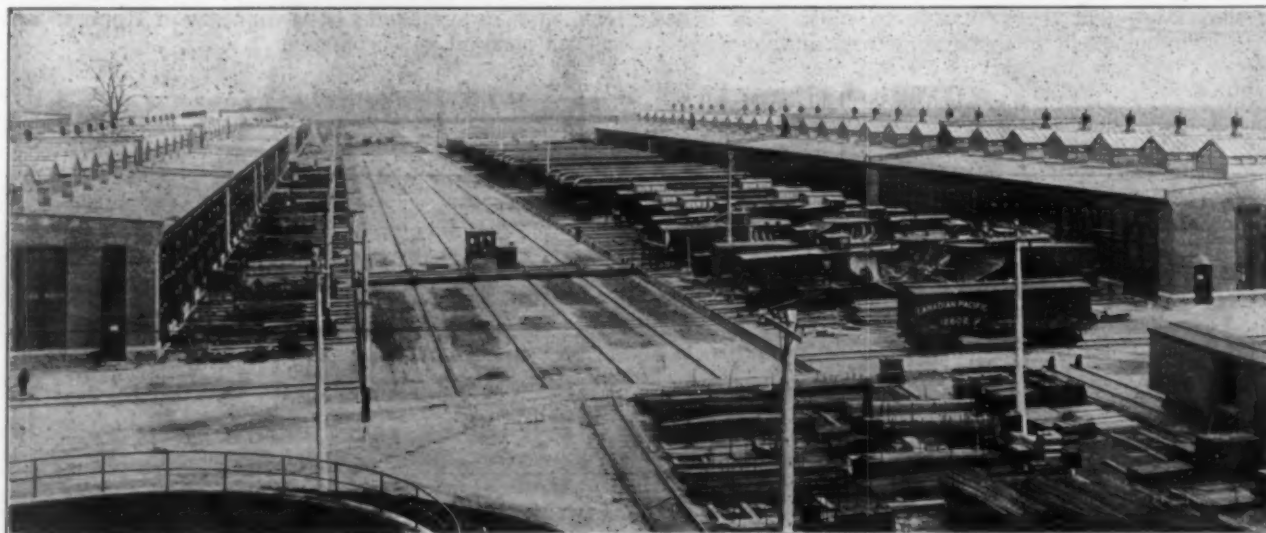
Address: Prof. W. J. Cunningham, Harvard University.

Discussion of report on Electric Rolling Stock.

Individual paper: "The Next Step," by Dr. W. F. M. Goss, affiliated member.

Discussion of report on Utilization of Locomotives.

Election of officers and members of General Committee.



General View of C. P. R. Angus Shops

# A Greeting to A. R. A., Division V

*Co-operation of American and Canadian railroad men  
further interests of railroads and countries*

By E. W. Beatty

Chairman and President, Canadian Pacific Railway

It is with great pleasure that I take advantage of the opportunity provided by *Railway Age* to extend on behalf of the Canadian Pacific Railway a welcome to Montreal to the Mechanical Division of the American Railway Association. This company has long been a member of the organization; the members of the mechanical staffs have always been in close association with those of United States railways to what I believe must be of mutual advantage to both the men themselves and the companies they represent. The Canadian Pacific in common, no doubt, with all the railroads of this continent appreciate to the full the splendid work and study that has been accomplished by the Mechanical Division of the Railway Association in the way of standardizing equipment and thus permitting the free interchange of traffic which is so remarkable a feature of railroad work on this continent. The railways of the two countries have necessarily much in common since the volume of traffic across our international border is so great, and it is a happy augury of the future that they are able to work together on a basis of complete understanding and mutual respect

quite in keeping with the feeling which the Canadian people have for those of our great neighbor to the south.

Canada is this year celebrating her sixtieth year of Confederation, and it is particularly fitting that you should make your visit to us at this time. This country has come through many periods of alternating prosperity and difficulty, but has steadily developed to its present state, and we believe that the outlook for its immediate future is bright with promise of rapid and soundly founded growth and development. The Canadian Pacific Railway was built as a part of the arrangement under which Confederation was effected and since it first joined together the scattered settlements now known as Canada it has steadily worked for the up-building and development of the country. It was a pioneer transcontinental railroad and like most pioneer railroads, it had to populate and develop the country it opened up.

On behalf of the officers and men of the Canadian

Pacific I am glad to welcome their confreres from United States lines, and I hope your stay in Montreal will be both pleasant and profitable.



E. W. Beatty



Railroad Bridge Over the St. Lawrence Near Quebec



Vancouver Harbor, New C. P. R. Pier Second in Foreground

## The Canadian Pacific

*Owing its inception to participation of western provinces in Confederation, system has played continuously important role in Canada*

By Charles W. Foss,  
Financial Editor, *Railway Age*

CANADA will shortly inaugurate the ceremonies incident upon the celebration of the 60th anniversary of confederation and the formation of the Dominion. It is expected that its two great railway systems will play an important role in the diamond jubilee exercises. Such would be only in keeping with the fact that important portions of each were built as a result of conditions under which confederation was accepted by the provinces on either coast.

Confederation came about in 1867. However, when the first Dominion Parliament met in December of that year, it was attended only by members from what had formerly been known as Upper and Lower Canada and the Maritime Provinces. These include respectively the Provinces of Ontario, Quebec, Nova Scotia and New Brunswick but none of the present western provinces. It was not until three years had elapsed that the Dominion was outlined in its present form by the inclusion of this vast western empire. Manitoba and the Northwest Territory now included in the provinces of Saskatchewan and Alberta came into the confederation in 1870 following the effecting of arrangements which turned over to the new Manitoba provincial government and to the new Dominion government control of the areas hitherto held by the Hudson's Bay Company. From the standpoint of the Canadian Pacific, however, the most important step taken also in 1870 was the joining of British Columbia, not alone because it completed the

formation of the Dominion, but because the step was taken on a condition, the fulfillment of which was the organization and building of the Canadian Pacific itself.

British Columbia accepted the terms of union on a condition that inside of ten years a railway should be built across the Rockies giving the people and goods of the province access—hitherto practically unavailable by land—to the eastern portions of the Dominion. This condition the Dominion government attempted to fulfill but at the end of the allotted ten years it has completed only a line from Emerson on the United States boundary north to Selkirk, from Port Moody to Kamloops in the west, and had made some progress on the line from Red river east to Fort William at the head of Lake Superior. It had at one time sought to interest the English capitalists back of the Grand Trunk in the project, but unsuccessfully. There had been scandals with respect to excessive cost and the delay in construction which had helped to overthrow one government or administration and had resulted in a royal commission of inquiry.

### Canadian Pacific Organized in 1880

Finally in 1880 the government, realizing its limitations as a railroad builder, sought again to interest private capital and succeeded this time in interesting a group of influential Canadians familiar with Canada and informed concerning its possibilities. This group included



among others, George Stephen, later Lord Mount Stephen, president of the Bank of Montreal; R. B. Angus, manager of the same bank; D. A. Smith, later Lord Strathcona, and J. J. Hill, who had already had some experience with railroads because of their interest



An Alberta Wheat Field—Village with Its Elevators on Horizon

in the St. Paul, Minneapolis & Manitoba, which was later to become the Great Northern. The syndicate organized the Canadian Pacific Railway Company and entered into a contract with the government, signed in October, 1880, to take over the lines already built or under contract and to complete the project and operate it henceforth as a private business enterprise.

The company started out with an authorized capital of 25 million dollars. The Dominion government turned over to it the lines already built (agreeing to complete unfinished portions already under contract) totaling some 734 miles and agreed to give the new company a subsidy of 25 million dollars and land totaling 25 million acres, and agreed to allow it to issue and grant bonds at a certain rate per mile totaling a further 25 million. In addition to the lines which the company was given it was authorized to acquire by purchase lines in eastern Canada, and the contract contained a provision that the railroad should be completed from Montreal to the Pacific coast inside of a ten-year period.

The remarkable feature of the early history of the new railroad was the extremely short time required by it to perfect its organization and to get under way as a going concern. George Stephen was the first president. The company was fortunate in securing the services at an early stage in the proceedings of William Van Horne, general manager of the Chicago, Milwaukee & St. Paul, and with Mr. Van Horne, there came to the railroad T. G. Shaughnessy who had been on Mr. Van Horne's staff on the Milwaukee and who was appointed purchasing agent at Montreal. Mr. Van Horne was later to become the second president of the railroad and he was succeeded by Mr. Shaughnessy,

later Lord Shaughnessy, as the third president.

The great amount of enterprise shown by the group of men managing the company's affairs is indicated by the series of events which followed each other with what to us now may seem surprising rapidity. Thus, in the single year 1882, the company succeeded in extending its line from Winnipeg to the extent of 418 miles, and its total construction in that year inclusive of branch lines totaled over 500 miles. The government had agreed to complete the line between Selkirk and Ft. William but decided that the new Canadian Pacific could do the work more efficiently and turned that part of the contract over to the latter's engineers. There was some question concerning the connection between Ft. William and the East. Mr. Hill preferred to have the connection made by using American lines south of the Great Lakes and as a result of the difference of opinion which resulted when decision was reached to build this link entirely on Canadian soil north of the Lakes, retired from the company and henceforth devoted his services to his own Great Northern.

#### Fulfillment of Contract—November, 1885

To secure its eastern lines the company acquired control of the Canada Central, extending west and south from Ottawa, and in 1882 purchased the western division of the Quebec, Montreal, Ottawa & Occidental, which gave the new system its Montreal connection. It was in November, 1885, that the new line extending westward across the Rockies met the construction east from the Pacific at Craigellachie, thereby completing the Montreal-Pacific coast route. The date was five years behind that set by British Columbia when it joined the confederation but it was five years ahead of the time established in the contract made between the Dominion government and the Canadian Pacific.

#### Extension of Lines

The first duty put upon the new company following the completion of its main line in fulfillment of its contract was to cultivate settlement and to build the necessary feeder and connecting lines that would round it out as a transportation system. These included numerous branches and the



Windsor Station, Montreal, the C. P. R.'s Headquarters

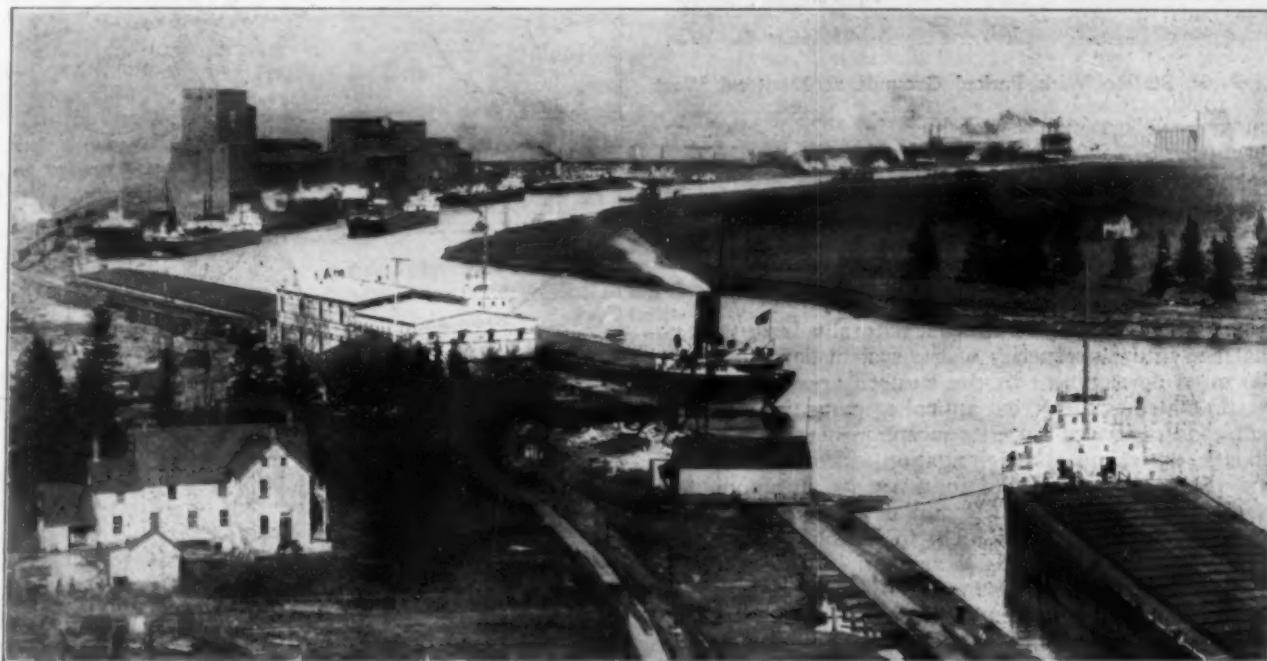
various connections with the United States lines south of the international boundary; an important extension was that to St. John, N. B., made effective in July, 1890, by the gradual leasing or purchase of already existing lines and certain new construction. In 1890 the company acquired control by purchase of a majority of the stock of the Minneapolis, St. Paul & Sault Ste. Marie and the Duluth, South Shore & Atlantic, which gave it better access to the grain and other markets of Minneapolis and Chicago and

which made possible, if desired, the use of a more economical line from Winnipeg east via Sault Ste. Marie. The company's main line between Montreal and Vancouver totaled 2,895 miles. At the end of 1885 the company had a total of 4,338 miles. By 1890 this had been increased to 5,564 and by 1899 to 7,000. Exclusive of the Soo Line the company's mileage at the present time totals 15,000 to which the Minneapolis, St. Paul & Sault Ste. Marie and the lines operated in connection therewith add an additional 5,100.

## C. P. R.'s Varied Activities Aid Canada's Development

Railroad publicists always make much of the economic and political value of railroads and the manner generally in which railroad systems assist in the welfare of the communities which they serve. The officers of the Canadian Pacific are particularly proud of the relationships that exist in these respects between the railway system and the Dominion of Canada. Their right to do this may be seen from the foregoing, because the

Canadian Pacific operates a group of hotels, thereby furnishing accommodations to the great body of tourists which supply a large proportion of its total passenger business. It has, since 1889, operated trans-Pacific steamship services and since the early 90's similar services on the Atlantic as well as service on the Great Lakes and British Columbia lake and river services. The road, furthermore, operates its own dining, parlor and sleeping



Elevators and Grain Vessels at Fort William

property had its origin in the very inception of the government and because its building followed from one of the terms that included the western provinces.

Another circumstance is the rather all-inclusive character of the system's operations. Thus it serves all parts of Canada, in addition to which it carries on operations outside of its railroad activity which are of the greatest importance to the economic life of the Dominion.

On the whole, the Canadian Pacific has many points of difference from its neighbors south of the international boundary. First among these is the fact that there is no United States transcontinental carrier in the full sense of that term. There can be no doubt that Canada has benefited greatly from the great prosperity and consistently conservative financial policy of the Canadian Pacific in which respects the company has few rivals in the United States. The railroad, furthermore, since its inception, has retained within its own organization all of the operations which it was the tendency for the American railroads to turn over to outside interests. Thus, the

car services, its own express and telegraph service and even the news stands in the stations.

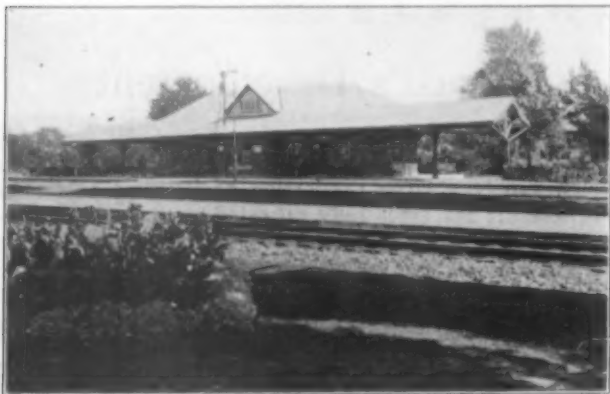
### Special Services Yield 11 Million Yearly

Some idea of the other than railroad operations that the Canadian Pacific management carries on is indicated by the fact that the net revenue from them totals about 11 million dollars yearly. This is equivalent to slightly over \$4.00 per share on the ordinary stock and of the total 10 per cent dividends on that issue, 3 per cent is paid from the special services. The full details are given in Table I. The company's chain of hotels at present numbers 14, in addition to which there are 11 bungalow camps. These have involved a capital expenditure of 34 million dollars. The company is about to add to this a new hotel at Toronto. The telegraph lines include a pole mileage of no less than 15,431, a total wire mileage of 134,000 and a cable mileage of 400. The steamship operations are especially extensive and the tonnage of ships in lake, coast and ocean services in



operation or under construction amounts to 469,000 tons.

It will be noted also that the company secures a large revenue from investments. For one thing it is the largest stockholder in the Consolidated Mining & Smelting Company, which in 1926 produced 8 per cent of the world's supply of lead and 5 per cent of the world's supply of zinc. Another interesting feature is the large revenue from coal, oil and natural gas rights under



C. P. R. Station With Parked Grounds at Montreal West lands in Alberta which revenues in 1926 totaled, respectively, \$239,000, \$338,000 and \$176,000.

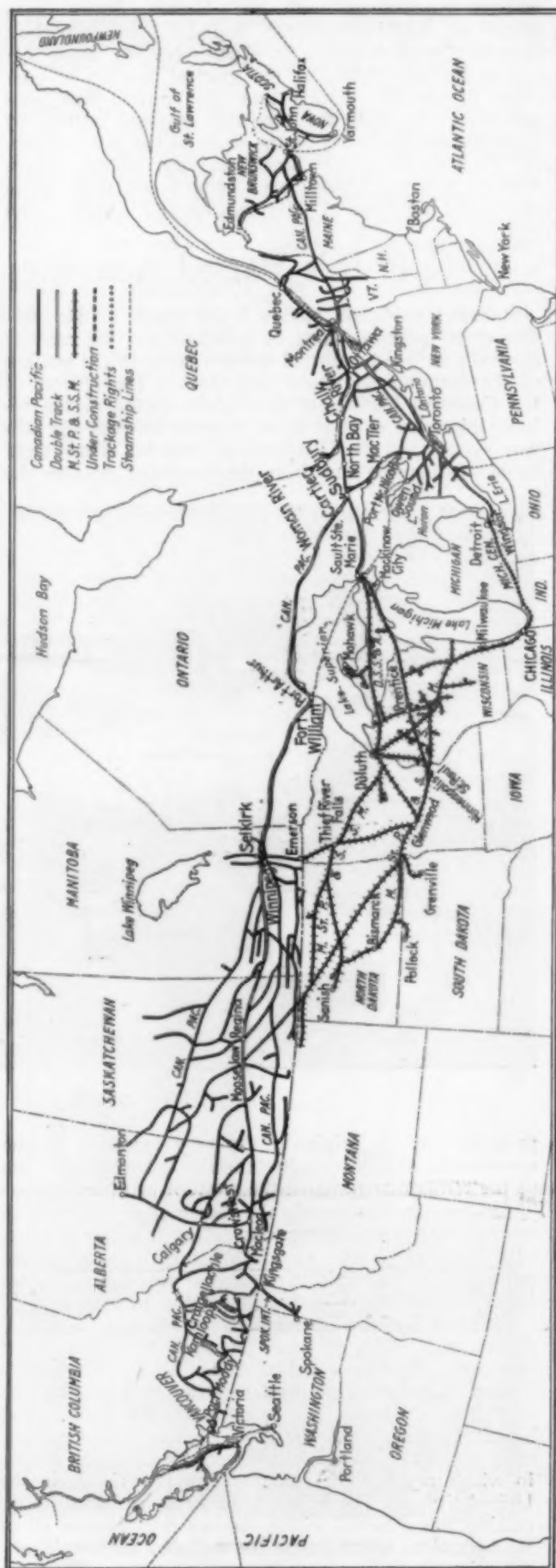
#### Elaborate Development and Colonization Service

Equally important from the standpoint of the economic progress of Canada is the elaborate development and colonization service that the railroad has carried on for years. The company was awarded a large subsidy of land. The management realized naturally from the first that the future prosperity of the system depended upon the rapid development of the western areas. President Beatty stated at the recent annual meeting that the company had expended since its inception nearly 75 million dollars on colonization, irrigation, farm development and the encouragement of industry, or an amount exceeding that spent by the Dominion government on like work in the same period. Up to March 31, 1926, the company had sold 14,705,605 acres of its land grant.

"I know of no organization in any country," said Mr. Beatty said, "which gives such terms to settlers as does your company and at no time during the life of the contract is a purchaser called upon to pay more than \$200 a year on each quarter section except in the case of the higher priced irrigated lands. In the United States and other countries, he would pay more than this amount in annual rental alone."

In 1926, the colonization department was responsible for the movement of approximately 50,000 immigrants from Europe and the placing of them on farms or in agricultural employment. The colonization department maintains no less than 65 offices or representatives in Great Britain and on the continent and five district offices and 146 agencies in the United States as well as the various agencies in the Dominion itself. A recent interesting development is the so-called colonization board movement in which the co-operation of local communities has been secured and a system worked out whereby the immigrant is assured of employment in the Dominion before he leaves the mother country.

With further reference to the irrigated lands, Mr. Beatty said: "The irrigation work established by this company has in itself constituted a really exceptional national enterprise, and by this course and the incurring of heavy expenditures the company has relieved the





government of what would have been a very heavy burden on the taxpayer had the government itself undertaken it. This irrigation system is the largest private enterprise of its kind ever carried out and has proven that even that portion of Canada apparently doomed by uncertain rainfall to agricultural failure, could be successfully transformed into a splendid source of national

wealth. Some idea of the magnitude of the system is apparent when it is considered that in the distribution of water in the western and eastern divisions of the irrigation block over 4,000 miles of main and secondary canals and distribution ditches are utilized. Approximately 20 million dollars has been expended upon this undertaking."

## Conservative Financial Policy and Consistent Earning Power

Readers more familiar with railroad practices in the United States will find food for thought in the fact that President Beatty's address at the stockholders' annual meeting was considered to have sufficient public interest so that the Canadian newspapers quoted no inconsiderable portion of it and some ran it in full. A particularly interesting section of the address gave an analysis summarizing the Canadian Pacific's position from a financial point of view.

The president, with regard to this, said: "The question is often asked why it is that your company under a low scale of rates is able to earn its regular dividends of 7 per cent from rail earnings. The answer to that question is simple. The capitalization of the company is extremely moderate notwithstanding the rather substantial borrowings it has been necessary to make since the war. The actual cash invested in its rail properties is \$964,537,000, while the par value of its securities and stocks in the hands of the public is \$678,450,000. In other words, there is invested in the property \$286,087,000 not represented by any security and which does not carry any interest or other charges.

"A second reason which contributed to the company's ability to earn reasonable dividends even when commercial conditions were sub-normal, has been its conservative and efficient administration over a long period of years. Efficiency in operation means, of course, econ-



A C. P. R. Liner, the "Empress of Canada"

omy in operation. The company's record has fortunately been consistently good and the scrutiny of its expenditures careful and honest.

"It is, however, needless for me to assure the shareholders that there is a third factor which enters into the adequacy of the revenue of the company and that is the availability of surplus earnings for re-investment in improvements and betterments. These are as essential to the protection of the integrity of the property as a physical unit and as an earning factor, as are the payments of interest and dividends to the protection of its credit."

### Low Rate Level

On the whole, there are several of the more prosperous railroads in the United States of which the foregoing might be said, including, for instance, the Atchison, Topeka & Santa Fe, the Pennsylvania, the Southern Pacific or the Atlantic Coast Line. However, there are important points of difference, not the least of which is that the Canadian Pacific in 1926 carried its freight traffic with an average revenue per ton-mile of only 1.01 cents. This compares with the figures for the other roads mentioned, with the railroads of the United States, or with roads even in the Northwestern region, which from a traffic standpoint are most nearly comparable, as follows:

|                                   | Rev. per ton-mile<br>1926-cents |
|-----------------------------------|---------------------------------|
| Canadian Pacific .....            | 1.01                            |
| Atchison, Topeka & Santa Fe ..... | 1.203                           |
| Pennsylvania .....                | 1.024                           |
| Southern Pacific .....            | 1.401                           |
| Atlantic Coast Line (1925) .....  | 1.456                           |
| Northwestern Region .....         | 1.125                           |
| All Class I roads in U. S. ....   | 1.082                           |

In discussing this point more at length, President Beatty said:



Banff Springs Hotel at Banff, Alta., One of the C. P. R.'s Hostelties

"It will be interesting to you to know that the return on the investment—not valuation—of your properties for the year 1926 was 4.66 per cent leaving a surplus from railway operations after payment of charges and dividends of 0.77 per cent. The average return on investment for what is known as Class I railways in the United States for the same year was 5.13 per cent.

to the heavy financing since the war. In 1926, the company sold 12 million 4½ per cent equipment notes and 20 million 4½ per cent 20-year collateral trust gold bonds secured by deposit of \$25,000,000 of the debenture stock. Stockholders have recently authorized an increase in the ordinary stock amounting to 75 million dollars, the stock to be sold at such time, at such prices

Table I—Canadian Pacific Operating Results, Selected Items, 1917 to 1926

|        | Railroad income   |               |                       |                                  |                         | Special income               |                      |                           |                         |                      | Total income                          |                |                          |
|--------|-------------------|---------------|-----------------------|----------------------------------|-------------------------|------------------------------|----------------------|---------------------------|-------------------------|----------------------|---------------------------------------|----------------|--------------------------|
| Year   | Net from railroad | Fixed charges | Surplus after charges | Earnings per share from railroad | Surplus after dividends | Net revenue from investments | Interest on deposits | Ocean and steamship lines | Telegraph, hotels, news | Total special income | Earnings per share for special income | Total earnings | Total earnings per share |
| 1917.. | 46,546,018        | 10,229,143    | 36,316,875            | 11.78                            | 12,420,916              | 2,010,912                    | 2,697,087            | 3,724,720                 | 2,280,580               | 10,713,299           | 4.12                                  | 47,030,174     | 15.90                    |
| 1918.. | 34,502,388        | 10,177,513    | 24,324,875            | 7.85                             | 2,203,621               | 1,928,483                    | 2,779,854            | 1,214,869                 | 2,205,545               | 8,128,752            | 3.12                                  | 32,453,627     | 10.97                    |
| 1919.. | 32,933,036        | 10,161,510    | 22,771,527            | 7.82                             | 844,250                 | 1,765,220                    | 1,040,544            | 3,567,510                 | 2,676,067               | 9,049,342            | 3.48                                  | 31,820,869     | 10.80                    |
| 1920.. | 33,153,045        | 10,775,409    | 22,377,636            | 7.18                             | 450,359                 | 2,436,717                    | 2,057,328            | 2,741,146                 | 3,731,257               | 10,966,448           | 4.21                                  | 33,344,084     | 11.39                    |
| 1921.. | 34,201,740        | 11,519,072    | 22,682,668            | 7.30                             | 755,391                 | 2,307,332                    | 1,840,867            | 2,785,615                 | 4,053,386               | 10,987,199           | 4.22                                  | 33,670,867     | 11.52                    |
| 1922.. | 36,301,691        | 13,348,906    | 22,952,785            | 7.40                             | 1,025,509               | 2,694,979                    | 1,957,190            | 3,448,293                 | 2,991,892               | 11,092,355           | 4.26                                  | 34,045,140     | 11.66                    |
| 1923.. | 37,479,010        | 13,470,653    | 24,008,357            | 7.63                             | 1,633,347               | 2,158,178                    | 1,545,355            | 4,292,141                 | 3,395,379               | 11,391,052           | 4.38                                  | 35,399,409     | 12.01                    |
| 1924.. | 37,227,242        | 14,070,287    | 23,156,955            | 7.18                             | 463,614                 | 645,756                      | 3,059,507            | 3,630,675                 | 2,635,314               | 9,971,252            | 3.83                                  | 33,128,207     | 11.01                    |
| 1925.. | 40,154,776        | 14,438,517    | 25,716,258            | 8.15                             | 3,010,315               | 1,755,003                    | 3,313,249            | 2,881,651                 | 3,407,472               | 11,357,375           | 4.37                                  | 37,073,633     | 12.52                    |
| 1926.. | 44,945,127        | 14,676,359    | 30,268,768            | 9.87                             | 7,462,825               | 2,576,410                    | 2,940,485            | 2,053,883                 | 3,485,492               | 11,056,271           | 4.25                                  | 41,325,039     | 14.12                    |

Note—Railroad gross earnings and working expenses are shown in Table III.

This rate applied to the investment in the Canadian Pacific properties would produce \$49,480,000 in net earnings and a fair return of 5¼ per cent would yield \$55,460,000."

The actual earnings in 1926 were \$44,945,127. Mr. Beatty continued in a vein that is not without its parallel south of the boundary when he referred apparently to the rate inquiry now proceeding before the Board of Railway Commissioners for Canada as follows: "These figures indicate that the Canadian railways are not yet earning adequate net revenues; that under the existing rate scales their revenues in the aggregate are unduly low rather than unduly high; and that with mounting wage scales they are not able and should not be asked to submit to further reductions in rates and the lessening of their receipts."

#### Capital Structure

The capital structure of the Canadian Pacific is patterned more after that of English than American corporations. The capitalization totals \$687,000,000, exclusive of \$18,410,000 of equipment obligations. The stock totals \$360,148,588 and is in two issues; including \$100,148,588 of 4 per cent prior preference stock and

and under such conditions as the directors may decide.

The very conservative character of Canadian Pacific financing is shown by several interesting facts. Thus, whereas the capitalization totals 678 million, the company's properties and investments are shown in the balance sheet as totaling 1,058 million. The working assets, including principally materials and supplies and cash, as of December 31, 1926, totaled 80 million as against current liabilities of only 16 million. The company has a surplus of 260 million which is equivalent to \$100 a share on the ordinary stock. The liability side of the balance sheet also shows an item of 74 million "Net proceeds lands and town sites."

The balance sheet as published in the annual report shows that the railroad and lake and river steamers are carried at a value of 664 million dollars and the ocean and coastal steamship at 62 million. Securities in controlled companies, principally bonds, are carried in an item of "acquired Securities" at a cost of 143 million dollars, etc. Of particular interest is the item "Assets in land and property." This includes the still unsold 6,038,000 acres of land carried at a value of 94 million. This item is particularly remarked as indicating Canadian Pacific financial conservatism because there are carried

Table II—Revenue Freight Traffic Statistics

| Year   | Number of tons carried | Number of tons carried one mile | Earnings per ton per mile (cents) | Tons of revenue freight carried one mile of road | Freight train-miles | Total freight car mileage | Average number of tons of revenue freight per train-mile | Average number of tons of revenue freight per loaded car-mile | Freight train earnings per loaded car-mile (cents) | Number of passengers carried one mile |
|--------|------------------------|---------------------------------|-----------------------------------|--|---------------------|---------------------------|--|---|--|---------------------------------------|
| 1917.. | 31,199,000             | 14,882,991,000                  | 0.70                              | 1,129,908  | 25,182,863          | 891,205,338               | 538.85   | 23.77   | 16.59  | 1,488,975,000                         |
| 1918.. | 29,857,000             | 13,014,666,000                  | 0.85                              | 991,680  | 22,326,115          | 763,658,659               | 530.44   | 23.90   | 20.24  | 1,289,280,000                         |
| 1919.. | 25,103,000             | 11,121,322,000                  | 1.00                              | 840,928  | 19,994,867          | 689,471,128               | 498.07   | 22.08   | 22.15  | 1,776,741,000                         |
| 1920.. | 30,160,000             | 13,994,509,000                  | 1.04                              | 1,066,401  | 24,335,581          | 828,133,793               | 529.25   | 23.44   | 24.34  | 1,732,050,000                         |
| 1921.. | 23,711,000             | 10,811,087,000                  | 1.19                              | 818,743  | 18,828,421          | 658,630,349               | 519.49   | 24.21   | 28.95  | 1,373,929,000                         |
| 1922.. | 27,745,000             | 12,977,400,000                  | 0.99                              | 976,479  | 22,330,177          | 783,092,136               | 534.23   | 24.53   | 24.43  | 1,260,713,000                         |
| 1923.. | 30,853,000             | 14,500,617,000                  | 0.93                              | 1,087,711  | 24,972,784          | 900,502,156               | 534.76   | 24.83   | 23.07  | 1,346,030,000                         |
| 1924.. | 28,776,000             | 12,648,623,000                  | 0.98                              | 930,564  | 22,097,113          | 779,717,713               | 519.58   | 24.05   | 23.59  | 1,230,985,000                         |
| 1925.. | 31,090,000             | 13,275,707,000                  | 0.97                              | 955,333  | 23,223,411          | 858,092,094               | 526.88   | 23.39   | 22.69  | 1,259,633,000                         |
| 1926.. | 33,593,000             | 14,049,460,000                  | 1.01                              | 998,520  | 24,775,245          | 907,059,619               | 521.59   | 23.29   | 23.49  | 1,263,327,000                         |

\$260,000,000 ordinary stock which pays 10 per cent. The larger part of the funded debt is embodied in the \$264,244,882 outstanding 4 per cent consolidated debenture stock. This debenture stock is more in the nature of a bond except that it does not have a mortgage and is in perpetuity. It has no right of foreclosure on default of interest but there is a provision that if interest is not paid the debenture stock shall have voting power in place of the preferred and ordinary stocks as long as the interest is unpaid.

The company's fixed charges in 1926 totaled \$14,676,359. In 1918 they totaled \$10,177,513, which bears out the point mentioned by President Beatty with reference

at the nominal value of \$1.00 each, coal rights under land totaling 3,000,000 acres, natural gas rights and petroleum rights in Alberta which in 1926 yielded revenues of no less than \$239,000, \$338,000 and \$176,000 respectively.

#### Pays 10 Per Cent Dividends

Canadian Pacific ordinary stock pays 10 per cent dividends. As the Canadian Pacific accounts are drawn up, the railroad earnings pay the fixed charges and dividends on the preferred stock and as above noted 7 per cent on the ordinary stock. The remaining 3 per cent on the latter is paid from the net revenue from in-



vestments, interest on deposits, the net income from the ocean and steamship lines and the net income from the telegraph, hotel and news stand operations. The Canadian Pacific has consistently earned both the 7 per cent dividends from railroad earnings and the 3 per cent from special services.

A more complete record is shown in Table I which gives the figures for the past ten years. It will be observed that in no year, even under the adverse conditions ruling during the period of recovery after the war, has the road failed to show earnings per share on the ordinary stock from the railroad operations of less than \$7.00. In 1925, increased economy of operation increased the earnings per share to \$8.15 and in 1926 the additional factor of increased traffic produced a figure of \$9.87. Income from special services has approximated over ten million dollars a year or about \$4.00 a share on the ordinary stock. In 1926 it totaled over 11 million dollars which, while less than in 1925, still amounted to \$4.25 a share.

Earnings from both the railroad operations and the special services in 1926 totaled \$14.12, the best figure reported since 1917, when, with smaller fixed charges, but with the same amount of ordinary stock outstanding, the per share earnings totaled \$15.90. Canadian Pacific stock

It was, however, pointed out that the mileage of the system totals 15,000 exclusive of the Soo Line. Its lines extended from coast to coast and presumably there is met on them nearly every variety of operating conditions outside of those encountered in tropical countries. One complication is cold weather, especially on the line north of Lake Superior. The main-line crosses the Continental Divide of the Rocky mountain at Stephen, Alberta, at an elevation of 5,213 ft. On the original line the grade on the west slope was 4.4 per cent but in more recent years the noted Spiral tunnels have been built and the ruling grade has been reduced to 2.2 per cent. The old line through the Selkirk Range at Rogers Pass surmounted an elevation of 4,340 ft. but the Connaught tunnel brought this down to 3,787 ft. The tunnel, 5 miles long, is the longest in North America. It was built at a cost of 5¼ million dollars and recently \$2,865,000 was spent on lining it with concrete.

The double-track main-line between Winnipeg and Fort William, 425 miles, has a 0.4 per cent grade. It was revised to this grade between 1905 and 1910 at a cost of over 13 million dollars.

The road's standard rail is now of 100-lb. weight. At the opening of the 1927 season there were 2,686 miles of line having rail of this weight and the budget calls

Table III—Passenger and Freight Revenues and Expenses and Ratios of Operation

| Year   | Passenger revenues | Freight revenues | Total revenues | Maintenance of way expense | Ratio | Maintenance of equipment expenses | Ratio | Transportation expenses | Ratio | Total expenses | Ratio |
|--------|--------------------|------------------|----------------|----------------------------|-------|-----------------------------------|-------|-------------------------|-------|----------------|-------|
| 1917.. | \$30,238,986       | \$103,635,795    | \$152,389,335  | \$17,470,069               | 11.5  | \$23,404,263                      | 15.4  | \$53,029,260            | 34.8  | \$105,843,316  | 69.5  |
| 1918.. | 30,837,254         | 110,187,288      | 157,537,698    | 22,646,106                 | 14.4  | 28,226,991                        | 17.9  | 61,047,813              | 38.7  | 123,035,310    | 78.2  |
| 1919.. | 46,182,151         | 111,064,442      | 176,929,060    | 28,912,220                 | 16.2  | 33,897,728                        | 19.2  | 68,054,175              | 38.5  | 143,996,024    | 81.4  |
| 1920.. | 49,125,739         | 145,303,400      | 216,641,349    | 32,573,927                 | 15.0  | 46,350,793                        | 21.4  | 86,608,612              | 40.0  | 183,488,305    | 84.7  |
| 1921.. | 41,565,885         | 128,849,446      | 193,021,854    | 29,038,641                 | 15.0  | 36,746,816                        | 19.0  | 73,557,749              | 38.1  | 158,820,114    | 82.3  |
| 1922.. | 35,331,525         | 128,918,137      | 186,675,036    | 27,405,339                 | 14.7  | 32,009,461                        | 17.1  | 70,994,919              | 38.0  | 150,373,345    | 80.5  |
| 1923.. | 36,315,818         | 134,299,556      | 195,837,090    | 30,776,423                 | 15.8  | 34,124,839                        | 17.4  | 72,730,572              | 37.1  | 158,558,080    | 80.8  |
| 1924.. | 33,900,668         | 123,505,140      | 182,502,156    | 27,277,389                 | 14.9  | 32,640,070                        | 17.9  | 66,311,741              | 36.3  | 145,274,914    | 79.6  |
| 1925.. | 33,126,445         | 128,410,056      | 183,356,006    | 25,473,904                 | 13.9  | 33,108,545                        | 18.0  | 65,009,077              | 35.4  | 143,201,230    | 78.2  |
| 1926.. | 34,150,428         | 141,205,619      | 198,025,592    | 28,322,187                 | 14.3  | 36,722,467                        | 18.5  | 66,691,423              | 33.7  | 153,080,465    | 77.3  |

is selling at present at about 180, the 10 per cent dividends on that price giving a yield of 5½ per cent. The \$14.12 a share earnings would be equivalent to 7.85 per cent on the present selling price of the stock.

The Canadian Pacific inaugurated dividends on its ordinary stock in 1884 and has paid dividends on that issue in every year since without exception. The 1884 payments totaled 5 per cent, but in the years immediately following the rate was 3 per cent. From 1890 to 1893 it paid 5; in 1894 only 2½ and in 1895 only 1½, and in 1896 only 2, the 5 per cent rate being restored in 1899. The present 10 per cent rate was established in 1911. The preference stock was first issued in 1895 and has received its dividends without interruption.

#### Physical Characteristics

In analyzing Canadian Pacific operations the desirable procedure would be to compare its operating results with those of roads in the United States. This unfortunately is not readily possible because the Canadian Pacific sets up its accounts differently from its neighbors south of the international boundary and reports different statistics.

for 300 miles additional to be laid this year. Treated ties are being put in in increasingly large amounts. Thus of the 2,000,000 or so ties to be put in track on the Eastern lines this year about 1,700,000 will be treated and of the 2,800,000 to be put in on the Western lines about 500,000 will be treated. All new rail and all creosoted ties have tie plates.

#### Rock-Ballast

The road has still a comparatively small amount of rock-ballasted track. On the Western lines there are 81 miles of rock-ballast on double track out of Vancouver. The Eastern lines on December 31, 1926, had 1,099 miles rock-ballasted and 280 additional are to be rock-ballasted this year. Notation of the stretches of rock-ballasted track will give some idea of the mileage which the management apparently believes more important from a traffic standpoint. Thus the track is rock-ballasted between Quebec and Toronto; between Montreal and Ottawa; from Brookport via Farnham to Montreal; from North Bay to Cartier; and from Parry Sound to Romford. The stretches to be rock-ballasted in 1927 include

Table IV—Equivalent Gross Tons Hauled—1926

| Month          | Eastern Lines |               |                | Western Lines  |               |                | System         |                |                |
|----------------|---------------|---------------|----------------|----------------|---------------|----------------|----------------|----------------|----------------|
|                | Eastbound     | Westbound     | Total          | Eastbound      | Westbound     | Total          | Eastbound      | Westbound      | Total          |
| January.....   | 732,001,107   | 502,032,859   | 1,234,033,966  | 828,646,738    | 629,675,820   | 1,458,322,558  | 1,560,647,845  | 1,131,708,679  | 2,692,356,524  |
| February.....  | 656,892,644   | 459,545,809   | 1,116,438,453  | 536,390,134    | 457,548,234   | 993,938,368    | 1,193,282,778  | 917,094,043    | 2,110,376,821  |
| March.....     | 693,481,911   | 544,100,968   | 1,237,582,879  | 588,681,250    | 520,079,576   | 1,108,760,826  | 1,282,163,161  | 1,064,180,544  | 2,346,343,705  |
| April.....     | 622,896,286   | 547,976,164   | 1,170,872,450  | 758,426,992    | 558,460,705   | 1,316,887,697  | 1,381,323,278  | 1,106,436,869  | 2,487,760,147  |
| May.....       | 654,814,333   | 555,817,785   | 1,210,632,118  | 1,007,409,328  | 673,213,857   | 1,680,623,185  | 1,662,223,661  | 1,229,031,642  | 2,891,255,303  |
| June.....      | 602,861,769   | 542,333,847   | 1,145,195,616  | 870,524,745    | 614,474,165   | 1,484,998,910  | 1,473,386,514  | 1,156,808,012  | 2,630,194,526  |
| July.....      | 552,225,221   | 523,341,234   | 1,075,566,455  | 841,485,959    | 672,006,274   | 1,513,492,233  | 1,393,711,180  | 1,195,347,508  | 2,589,058,688  |
| August.....    | 560,473,727   | 509,890,391   | 1,070,364,118  | 769,737,300    | 647,024,203   | 1,416,761,503  | 1,330,211,027  | 1,156,914,594  | 2,487,125,621  |
| September..... | 585,703,255   | 519,895,745   | 1,105,599,000  | 1,536,089,029  | 879,620,098   | 2,415,709,127  | 2,121,792,284  | 1,399,515,843  | 3,521,308,127  |
| October.....   | 713,710,629   | 545,935,513   | 1,259,646,142  | 2,101,001,613  | 1,312,537,997 | 3,413,539,610  | 2,814,712,242  | 1,858,473,510  | 4,673,185,752  |
| November.....  | 667,487,366   | 500,198,294   | 1,167,685,660  | 2,397,925,011  | 1,211,184,742 | 3,609,109,753  | 3,065,412,377  | 1,711,383,036  | 4,776,795,413  |
| December.....  | 785,717,289   | 534,366,391   | 1,320,083,680  | 1,291,957,281  | 753,247,435   | 2,045,204,716  | 2,077,674,570  | 1,287,613,826  | 3,365,288,396  |
| Total.....     | 7,828,265,537 | 6,285,435,000 | 14,113,700,537 | 13,528,275,380 | 8,929,073,106 | 22,457,348,486 | 21,356,540,917 | 15,214,508,106 | 36,571,049,023 |



from Bedell via Ottawa and Carleton Place to Chalk River; from Parry Sound to MacTier and from Cartier to Woman River. A rock crushing plant has recently been completed at Bonheur, Ont., to facilitate ultimate rock-ballasting of the line between Winnipeg and Fort William.

#### Signals

Automatic signaling on the Canadian Pacific Railway is not yet extensive. The Eastern lines have a total of

395.1 miles of automatics, of which 282.4 is double track line and 112.7 single track. The Western lines have 255.9 miles, 11.4, double track, and 243.5 single track.

#### Equipment

The Canadian Pacific owns 2,255 locomotives, 90,000 freight cars, of which about 65,000 are box cars, 2,131 coaches, baggage and colonist cars; it operates its own sleeping, parlor, dining and café cars which total an additional 600.

## Freight Revenues and Traffic

The road in its annual report classifies its railroad revenues under four heads, these and the proportion of the total revenues yielded by each being as follows in 1926:

|  | Revenue       | Per cent of Total |
|--|---------------|-------------------|
| From passengers.....                             | \$34,150,428  | 17                |
| From freight.....                                | 141,205,619   | 71                |
| From mails.....                                  | 3,607,036     | 2                 |
| From sleeping cars, express and miscellaneous... | 19,062,592    | 10                |
| Total.....                                       | \$198,025,592 | 100               |

It would be desirable to effect a comparison of the character of the freight traffic moved with that on roads

The 1926 revenue ton-miles were greater than in 1925 but less than in 1923 or in 1917. The figure of revenue tons carried one mile per mile of road is particularly interesting in comparison with similar averages for roads in the United States. The Canadian Pacific total of 955,333 in 1925 compared with the United States Class I

|                                | Years ended December 31 |               |               |
|--------------------------------|-------------------------|---------------|---------------|
|                                | 1924                    | 1925          | 1926          |
| Flour, barrels.....            | 12,068,000              | 11,161,630    | 12,175,910    |
| Grain, bushel.....             | 231,805,276             | 263,462,503   | 252,085,434   |
| Live stock, head.....          | 2,043,015               | 2,073,801     | 1,961,237     |
| Lumber, feet.....              | 2,960,031,997           | 3,016,673,997 | 3,286,786,667 |
| Firewood, cords.....           | 304,779                 | 285,204       | 308,780       |
| Manufactured Articles, tons... | 8,033,774               | 8,541,238     | 9,607,147     |
| All other articles, Tons.....  | 8,402,617               | 9,234,382     | 10,415,506    |

road average of 1,749,147, or with the Western District average of 1,067,315. Canada may be over supplied with railway mileage as compared with its population but the Canadian Pacific's traffic density is not so greatly out of line with the American roads properly comparable with it as one might suppose.

#### Operating Expenses

Table III will be found of interest because it shows the classifications of Canadian Pacific expenses and the ratios of each group to total operating revenues. These figures, however interesting they may be otherwise as indicating the Canadian Pacific's own operating improvement year by year, cannot be compared with those of other roads. First, they include the sleeping car and express operations and the total expenses include the expenses of the lake and river steamers. Second, the operating expenses are not compiled on the basis of the I. C. C. classification of operating expenses. Thus, the maintenance of equipment expenses include no charges for depreciation, the Canadian Pacific having a different scheme for accounting for its equipment retirements. A third factor is the low revenue per ton per mile which would vitiate comparisons of the expense ratios with those of roads having a more satisfactory rate level. However, it will be observed that the operating ratio in 1926 was the best since 1917, whereas the transportation ratio was even better than in that year. Other than that the striking feature of the table is the fact that the Canadian Pacific succeeded in keeping control over its expenses in the years in which the American railroads were under federal control in a much better degree than the United States lines did. The result was that it did not have to effect such a striking recovery in the years immediately following.



C. P. R. Station at Regina, Sask., Is Typical of High Standard of Such Structures

in the United States but this unfortunately is impossible due to the fact that the Canadian Pacific does not show in its annual report the familiar classified commodity statements. The Canadian Pacific does, however, show the following statement which is good as far as it goes but which because the commodities are shown in different units does not permit one to determine the proportion that each bears to the total traffic.

#### Freight Statistics

Table II gives a group of additional revenue freight statistics. They show that the Canadian Pacific has had no very remarkable increase in traffic in recent years.

## Handling of Grain Traffic a Leading Problem

No one can understand Canadian Pacific operating conditions without knowledge of the importance of the grain crop. The road handles in a good grain year in the neighborhood of 250,000,000 bushels of grain. It might well be said that the greatest operating problem offered

to the railroad is the task of moving some 120,000 cars of western grain from the prairie provinces to the head of the lakes between the time the crop is harvested and the closing of navigation, which means a period of about 90 days.

The cars are brought from the country elevators on the numerous branch lines west of Winnipeg, into that city, there assembled and classified and then moved in solid trains over the double-track main-stem to the head of the lakes at Fort William and Port Arthur. There are elevators at these two adjoining cities having a total aggregate capacity of 58,000,000 bushels. The grain moves east almost entirely by boat, possibly through the Soo to Buffalo, now a leading flour milling center, or to such points as Port McNicoll or Owen Sound on Georgian Bay where it is transhipped for rail movement to Montreal for export to Europe. A large proportion of the grain moving to Buffalo is likewise transhipped to such points as New York, Boston, Philadelphia or Baltimore. There is also some movement westward out through Vancouver.

Table V

Statement Showing Proportion of Western Grain Crop Moving to Head of Lakes and to Vancouver.

| Crop year               | To Head of Lakes Cars | To Vancouver Cars | Total Grain Loaded Cars |
|-------------------------|-----------------------|-------------------|-------------------------|
| 1923.....               | 133,795               | 30,251            | 180,046                 |
| 1924.....               | 88,160                | 11,199            | 120,220                 |
| 1925.....               | 121,529               | 17,339            | 158,957                 |
| 1926 (to April 29)..... | 111,409               | 13,373            | 114,100                 |

Crop year runs from August 1 to July 31. The difference between total grain loaded and amount moved to Head of Lakes and Vancouver, accounted for by grain used at interior mills, etc.

One of the best ideas regarding the way the road has to be set up to handle the grain traffic is indicated by the fact that at Winnipeg the Canadian Pacific has its extensive Transcona yard which is used only in the grain-shipping season and at other times is used for the storage of cars. Formerly large quantities of grain moved all-rail after the close of lake navigation over the line north of Lake Superior or via the Soo Line. In recent years the amount of shipping on the Lakes has increased sufficiently to cut down the volume of this traffic. It is stated, however, that at Port McNicoll last winter when the lake froze there were 26 vessels loaded with grain which was drawn off as orders came in for it. Some

Table VI

Average Car Mileage per Day, 1926

|                | Eastern Lines | Western Lines | System |
|----------------|---------------|---------------|--------|
| January.....   | 29.69         | 21.56         | 24.71  |
| February.....  | 29.77         | 16.85         | 21.90  |
| March.....     | 30.26         | 18.48         | 23.20  |
| April.....     | 29.25         | 22.18         | 25.09  |
| May.....       | 29.03         | 27.63         | 28.21  |
| June.....      | 28.11         | 24.65         | 26.06  |
| July.....      | 26.23         | 23.75         | 24.75  |
| August.....    | 26.49         | 22.39         | 23.97  |
| September..... | 28.91         | 35.71         | 33.17  |
| October.....   | 30.91         | 47.58         | 41.38  |
| November.....  | 28.94         | 51.80         | 43.19  |
| December.....  | 30.49         | 28.78         | 29.43  |

grain, nevertheless, is held over the winter. This spring as soon as the Lakes opened the Canadian Pacific was at once called upon to move some 6,500 cars out of Winnipeg.

#### Variations of Traffic by Months

The problem from a railroad operating point of view is presented in more detail if one studies a year's figures of gross ton-miles by months. Such a tabulation is given in Table IV, which contains the monthly figures for 1926 divided eastbound and westbound for the Eastern lines, the Western lines and for the system. It will be observed that for the system the traffic in October was about double that of February, March or April. In the case of the eastbound movement on the Western lines about one-half was in the 90-day period of the grain movement and the November gross tons were twice those of December and three or four times some of other off-season months. It will also be noticed that on the Western

lines in November, 1926, the gross tonnage was 3,609,000,000, whereas the heaviest month prior to September was 1,681,000,000 or less than half, as much. With respect to grain, particularly in such a heavy grain year as 1925, there were loaded during the three months ending December 12 a total of 106,920 cars in western Canada while during the other nine months there were only 52,037.

#### Equipment to Handle Grain Traffic

The Canadian Pacific owns about 65,000 box cars. It will have distributed no less than 20,000 of these in



A C. P. R. Train Near Montreal

the grain territory before the harvesting begins. Box cars begin to accumulate in the grain territory even as soon as shortly after the close of the navigation in December. By May 1 this year there were 6,000 cars at Winnipeg and some 4,000 or 5,000 cars had already been distributed at local points. There is an added complication of providing grain doors. From 75 to 100 additional locomotives are required. These are put in the shop during the off-season where necessary, or possibly

Table VII

Fuel Consumption in Pounds per 1,000 Equivalent Gross Tons Hauled One Mile, Excluding Locomotive and Tender.

| Year      | Year |
|-----------|------|
| 1922..... | 126  |
| 1923..... | 124  |
| 1924..... | 123  |
| 1925..... | 114  |
| 1926..... | 115  |

| Year      | October       |               | November      |               |
|-----------|---------------|---------------|---------------|---------------|
|           | Eastern Lines | Western Lines | Eastern Lines | Western Lines |
| 1922..... | 104           | 103           | 139           | 107           |
| 1923..... | 105           | 105           | 137           | 105           |
| 1924..... | 101           | 100           | 132           | 112           |
| 1925..... | 109           | 109           | 122           | 109           |
| 1926..... | 117           | 102           | 128           | 110           |

they are operated on the all-rail service to St. John during the winter or elsewhere on the Eastern lines and will be worked out to the Western lines as conditions permit so as to be in readiness for the grain movement. Similarly it is necessary to repair the track before the call for harvest hands. It is also necessary to transfer or recruit train-crews and staffs of yard men, telegraphers, etc. Railroad men on western roads in the United States will not be unfamiliar with these things but the point is that all this has to be done by the Canadian Pacific with such

skill and economy that it can earn 7 per cent dividends on an average revenue per ton-mile of only 1.01 cents.

#### Miles Per Car Per Day

Other interesting data are secured from the record of the average miles per car per day which it will be observed in 1926 varied from 21.90 in February to 43.19 in November. On the Western lines the November average was 51.80, whereas the best month prior to September was 27.63 in May; while in February it was only 16.85.

#### Fuel Economy

Another interesting figure is the fuel consumption per 1,000 equivalent gross ton-miles, excluding engine and tender which it will be observed had decreased from 126 in 1922 to only 115 in 1926. In October, 1926, when the traffic was at its height, the Western lines reported a figure of but 102.

Figures are lacking of average freight train speed and gross ton-miles per freight train-hour. If the Canadian Pacific did report such figures they would probably show the same striking contrasts between the months when the grain is moving in volume and the other months of the year. The management has to keep in mind that its largest single operating problem is the movement of its grain crop which necessarily is a slow-speed drag proposition where speed has to give way to regularity and

economy of operation. It follows also that the locomotives it could use to move its grain trains on the branch lines leading into Winnipeg or from Winnipeg to the head of the lakes at Fort William or Port Arthur, must also be available after the close of navigation for service if desired elsewhere on the system in the off-season. There is no railroad in the United States which has a problem quite comparable.

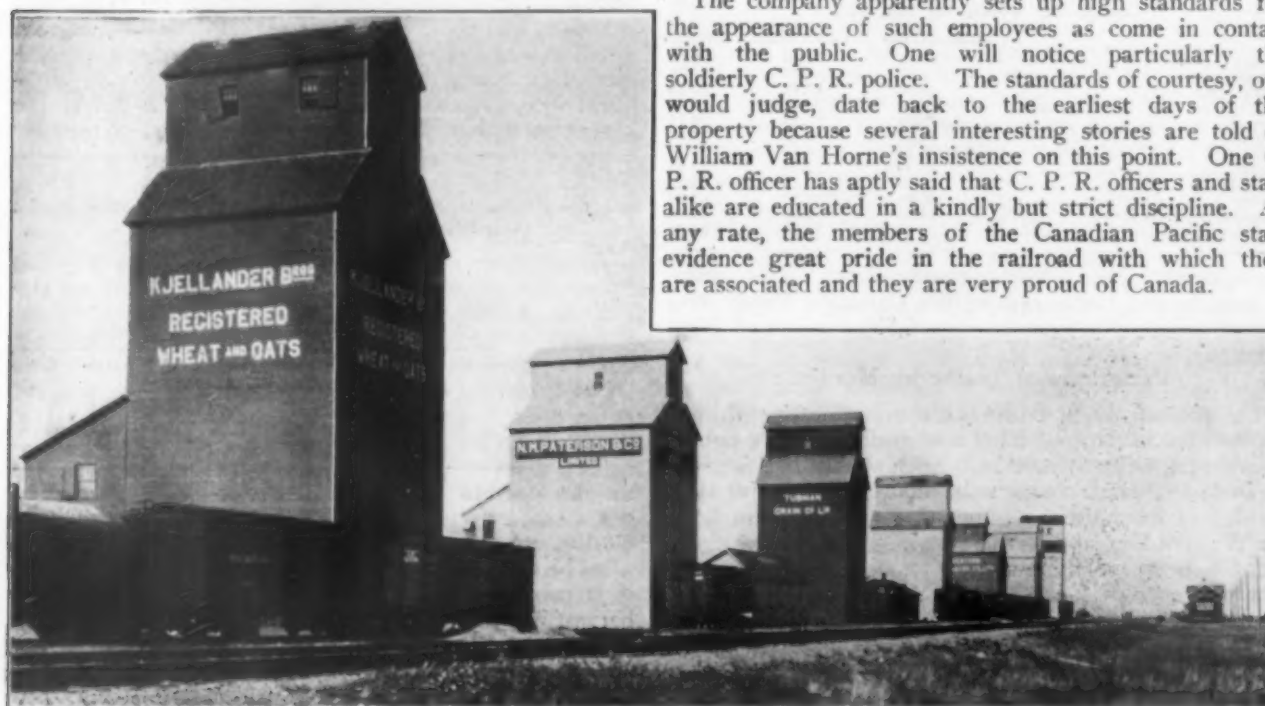
Somewhat the same factors apply with reference to the freight cars because of the necessity of storing cars for a long period while the supply of 20,000 is being built up in readiness for the fall grain movement. From this standpoint the necessity is to have cars which can be maintained economically and which must be kept in excellent condition to avoid grain spoilage. One who travels on the Canadian Pacific will observe that all equipment seems to be in excellent condition. Some railroad men might suggest that the locomotives are kept cleaner than demands of economy might justify but one doubts if a fuel consumption record of 115 lb. per 1,000 equivalent gross ton-miles could readily have been secured as it was in 1926 if the power had not been in extremely good condition. Similarly, considering the large number of cars that must be stored during the summer, one would imagine that bad order cars must have been kept decidedly at a minimum to permit car-miles per day of 25.09 such as were reported in an off-season month like April, 1926.

### Staff Educated in a Kindly but Strict Discipline

The true test, however, of Canadian Pacific policy will be found in the two factors of net income and the opinion of the users of the service. As far as the former is concerned it has already been observed that the Canadian Pacific succeeds consistently in earning 7 per cent dividends on its ordinary stock with a revenue per ton per mile of but 1.01 cents. There are few complaints in Canada regarding Canadian Pacific Railway service, however much complaint there may be regarding even the low rates that are in effect. The traveler on the

Canadian Pacific lines will notice a peculiarly pleasing efficiency that he may be led to characterize as military were it not so tempered with courtesy. This applies to the neatness of the stations and their surroundings. He will notice also that the facilities seem more than adequate rather than otherwise and he will be likely to receive a general impression of operations that take place with precision and snap a trifle more decisive than that characteristic of even the better roads in the United States.

The company apparently sets up high standards for the appearance of such employees as come in contact with the public. One will notice particularly the soldierly C. P. R. police. The standards of courtesy, one would judge, date back to the earliest days of the property because several interesting stories are told of William Van Horne's insistence on this point. One C. P. R. officer has aptly said that C. P. R. officers and staff alike are educated in a kindly but strict discipline. At any rate, the members of the Canadian Pacific staff evidence great pride in the railroad with which they are associated and they are very proud of Canada.



A Typical Station in the Grain Belt



# How Canada's Railways Have Grown

*Mechanical convention comes on eve of Canada's Diamond Jubilee—Railroad co-operation also began in 1867*

By Sir Henry W. Thornton

Chairman and President, Canadian National Railways

THE decision of the Mechanical Division of the American Railway Association to hold its convention in Montreal, in June, was one peculiarly gratifying to the Canadian members and is but another expression of the mutual confidence and good-will existing between the railroads of the two countries. As chairman and president of the Canadian National Railways, the greatest international railroad system in the world, operating lines stretching from Chicago to the Atlantic seaboard and practically two transcontinental systems, I can assure each delegate that every one of the army of Canadian National workers unite in welcoming them and that we appreciate the compliment paid us by the decision to hold their 1927 meeting on Canadian soil.

It is an interesting coincidence that the Mechanical Division should select for its convention a date that falls almost upon the eve of the nation wide celebration of the Diamond Jubilee of Confederation, an event which commemorates the initial step of welding the scattered colonies of British North America into a vast Dominion that was to reach from the Atlantic to Pacific coasts. The factors which led up to this momentous event were many and of them the construction of steam roads was a dominating one.

The history of the railways in Canada varies but little in its general structure from that of other nations, and, fundamentally, the colonies of British North America were actuated by the desire for a rapid and adequate method of transportation which would link them together, and, at the same time, provide a medium of opening new and hitherto remote sections for settlement. As one railroad-building era logically preceded the other, I shall sketch briefly the outline of its development in Canada. It was in 1837, some years after the opening of the first railway in the United States, that the steam road made its appearance in Canada and for almost a decade, although many companies were mooted on paper, but little real progress in further construction work was made.

Thus, while the first road was opened in lower Canada, or what is now the Province of Quebec, the initial road in Upper Canada, now Ontario, was not

opened until 1853. In the meantime, however, a more ambitious plan than either of the two lines was actively under way; in 1857 the Grand Trunk Railway opened the first section of its system between Montreal and Toronto. This event may be said to have inaugurated the first railway era in Canada.

At this period "King" Hudson of the English steam lines was ruling supreme in Britain and his stupendous paper profits had seized upon the imagination of the British speculators and investors. Soon the orgy of

building struck the Canadas, and numerous systems, such as the Great Western, the Northern, the Nippissing and other roads of various mileage were under construction. It must not be thought, however, that speculation and the hope of quick profits were the underlying motives in Canada. The need of colonization systems was acute and while many of these roads were doomed to financial disaster through lack of tonnage and population, they nevertheless proved a boon in building up the struggling nation and out of the network of competitive pioneer roads eventually appeared the Grand Trunk System with its chain of branch lines that was to serve the larger portion of Ontario, Quebec, as well as an important section of Michigan and Maine before its amalgamation with the Canadian National Railways.



Sir Henry W. Thornton

It was but natural that this outburst of railway construction in the Canadas should be watched closely by the other British colonies and while they realized its disadvantages, the advantages outweighed to a large extent the adverse considerations. The colonies lying to the east of the Canadas urgently required a rapid and efficient method of communication with their opulent neighbor to the west and on the Pacific Coast, British Columbia equally needed a similar method of transportation. Thus it was that when the idea of confederating the British colonies of North America was mooted both far-away British Columbia and the closer situated colonies of Nova Scotia and New Brunswick all united in a demand that an economic and a political union must be followed by the linking of the proposed provinces by the construction of a steam road. On this point the delegates from

(Continued on page 1727)



*International Limited Crossing Ottawa River onto the Island of Montreal at Ste. Anne de Bellevue, P. Q.*

## Canadian National Looks to Future

*Meantime each year brings advance in efficiency and operating returns to continent's largest railway*

By James G. Lyne

Associate Editor, *Railway Age*

**T**HE Canadian National Railways, the largest system in America in point of mileage, in their present amalgamated form, are a relatively young institution, dating back only to 1922. Component parts of the system, however, trace their history to the early days of railroads in Canada. Indeed, the first railroad in Canada, the Champlain & St. Lawrence, was absorbed by the Grand Trunk, and is now a part of the Canadian National System. Incidentally, it is perhaps significant that this first Canadian railroad, like so many lines which were to follow, was built to facilitate communication with the United States. Specifically this road provided, as its name implies, a connection between the navigable St. Lawrence river and the Canadian end of Lake Champlain, which latter could be reached by boat from New York. This first railroad was chartered in 1832, opened to service in 1836, and steam locomotives were used on it for the first time in 1837.

Likewise, the first international railroad to be built between Canada and the United States, i.e., the line from Portland, Me., to Montreal, is now an integral part of the Canadian National System.

### First Government Line Required

by Articles of Confederation

Canada this summer will celebrate the sixtieth anniversary of its Confederation into one Dominion. One of the agreements which were *sine qua non* of Confederation was the construction by the new Dominion government of a railroad to connect the Maritime provinces with the rest of Canada. This road, opened in 1876,

was the Intercolonial. It was the first government-owned line of a system which now has 22,682 route miles. Prior to the opening of this line Canada's only railroad outlet to the Atlantic was the Grand Trunk's line to Portland, Me.

### Many Lines Built Ahead of Traffic Needs

The story of the conditions which led up to the formation of the present Canadian National Railways system is fairly familiar. The decade before the opening of the world war was one of tremendous activity in railroad construction. The Canadian Northern and the Grand Trunk Pacific were being completed to the coast and the National Transcontinental, designed as the eastern end of the Grand Trunk Pacific, was built from Winnipeg across the Northern route to Quebec and Moncton, N. B. The Canadian government had guaranteed bonds of these companies and, as construction costs exceeded estimates, had been forced to make many cash advances for which stock in the companies was pledged as security. This policy has proved costly, but one must consider a lusty young nation, ambitious, with tremendous natural resources, lacking only in population to become truly great. And population cannot be attracted without adequate transportation.

Finally as the result of its policy combined with an unlooked-for war the government found left on its doorstep a tremendous railroad system which it had fostered but never had planned to own. The principal parts of this railroad were the Grand Trunk with the Grand Trunk Pacific, the Canadian Northern and the Inter-

colonial and other lines in the Maritimes. What to do? These lines were losing money heavily. No private concern could have afforded to operate them unless they were turned over as a virtual gift—maybe not all of them even on that basis. The Canadian people had too many millions invested to consider seriously such a plan. And the lines had to be kept in operation, even though at a loss, if faith were not to be broken with settlers who had moved in on a promise of railroad service. Moreover, there was the thought that some day, as the country developed, bringing traffic to lines then very lightly used, the road might be expected to pay something on the investment.

#### Organization Follows That of Private Corporation

In fine then, it was decided to go ahead with the lines under government control. However, the usual form of government operation prevalent elsewhere, i.e., a department operated under civil service rules by a cabinet minister, was not looked upon with favor. Instead it was decided to model the operation along the lines of a private corporation as nearly as possible, with a board of directors and a practical railroad executive at the head, who would be given a free hand to operate the property as a commercial enterprise. This new form of organiza-

consolidation of facilities. Favorable results were at once manifest and each succeeding year has brought further progress in efficiency, volume of business handled and net earnings. In 1926, for the first time in the history of the company, net earnings were sufficient to meet interest payments on all securities in the hands of the public, leaving \$2,196,381 to apply on the debt owed to the Canadian government. There still remained, however, taking interest on the government outlay into consideration, a net income deficit of \$29,894,073.

A large part of the sums owed to the Dominion government, however, represent advances to cover past deficits and are not, properly speaking, a capital charge. Supposing the railways were privately operated, financial necessity would have long since forced a re-organization to write off a large proportion of these charges. These charges, where they exceed the commercial value of the property as measured by its earning power, represent the price which the government elected to pay for railway expansion for colonization and development purposes. They have no real place in a railroad balance sheet, and they make difficult a fair comparison between the C. N. R. and other railroad companies.

The inclusion of such advances in the liabilities of the company, however unfortunate, was probably all but in-



Location Party on Hudson Bay Railway Emulates Eskimos in Attire

tion for a government railroad has attained great popularity and today many countries where the railroads are owned by the government are emulating the C. N. R. as far as possible in their organization. Finally, all the various separate companies were to be wiped out and the property operated as a unit (excepting, however, the Central Vermont, a purely United States line, which continued its separate organization). This plan was carried out. Sir Henry W. Thornton, the American-born and American-trained general manager of the Great Eastern Railway in England, was chosen as president and chairman of the board of directors.

#### Amalgamating the Independent Lines

Sir Henry took office in the fall of 1922 and under him the amalgamation of the various companies, already begun, was pushed rapidly to consummation, being virtually completed by the beginning of 1923.

The new management at once bent every effort toward increasing the efficiency of operation, taking advantage of the amalgamation of former competing lines, by a

avoidable. The capital structure of the railways has undergone considerable investigation and study, and it is believed that some modifications to bring its accounts down to a fair basis, when compared with other railways, will before long be proposed in Parliament.

#### Great Improvement Since Amalgamation

Until that time any relationship which may be drawn between earnings and obligations must continue to be unsatisfactory. And until such a change is made it will be difficult to discuss the Canadian National in comparison with other railways. In the meantime the only satisfactory comparison which can be made is one between various years' operations on the property itself. If this is done, the improvement to be noted is spectacular. Beginning with 1923—the first complete year under the new regime, we have the following:

| Year | Gross         | Net          | Operating Ratio |
|------|---------------|--------------|-----------------|
| 1923 | \$261,996,071 | \$21,413,042 | 91.83           |
| 1924 | 244,246,706   | 18,390,979   | 92.47           |
| 1925 | 253,708,774   | 33,443,298   | 86.82           |
| 1926 | 275,570,310   | 48,225,030   | 82.50           |



### Handles Much United States Traffic

The Canadian National, in spite of its ownership by the government and its importance to the Dominion as an opener and developer of new territory, is nevertheless an important international line. With its line to Chicago and others into New England it is an important United States carrier. Of its 1926 freight revenues 21 per cent were derived from business originating and ending in the



The Canadian National Has Many Rail Motor Cars

United States and 20 per cent from international business, i.e., traffic originating in the United States and destined to Canada or vice versa. In other words, 41 per cent of this road's total freight revenues came from traffic in which American shippers or consignees were directly interested.

### Importance of Grain and How It Is Handled

From a standpoint of freight traffic, grain ranks high in importance not alone because of its volume (13 per cent of total tonnage handled) but because of its seasonal character and the unusual arrangements which have been made to handle it. Roughly speaking, the traffic originates in the Prairie provinces and moves by rail to the head of the Great Lakes at Fort William and Port Arthur, or it moves westward to Vancouver or Prince Rupert. The westward movement has shown a tendency

cure 60 per cent. Moreover, the movement from lakes to tidewater is more leisurely and does not partake of the nature of peak traffic to the same extent as the earlier movement to the head of the lakes. To handle the traffic in the west the company has to maintain a minimum of 10,000 grain cars which are idle the rest of the year. It has also to place 25,000 additional cars in the western region for grain movement in the peak season. Many of these cars are rather small and old. Their retention is nevertheless justified, however, by the fact that much of the grain is loaded over the platform by individual farmers who often would not have sufficient grain to load a large car to capacity.

So heavy are the grain loadings in the latter months of the year that the weekly originated tonnage loadings of all commodities on the system during the August-December period reach a peak from 60 per cent to 70 per cent higher than in the lowest weeks of the year. In the western region alone grain contributed in 1926 about 58 per cent of the total ton-mileage.

Grain, however, is not the whole story of freight traffic on the Canadian National. It is important, because of the problems it brings and because of the dependence of much of the economic life of the country on such crops. But the road gives a high-grade service to shippers of other commodities.

### Other Traffic and Service

Reference has been made above to the importance of the United States business. The company does a large eastbound business into New England from Chicago and the west, handling fruits, packing house products and other high-grade commodities. It gives a third-day service from Chicago to Boston on a differential rate. One of its manifest trains in this service, "No. 484," is one of the road's greatest sources of pride and concern.

Other outstanding manifest movements give 4½-day service between Montreal and Winnipeg, and 4 days from Toronto to Winnipeg. Vancouver in freight service is 15 days from Halifax, 11 days from Montreal and 10 days from Toronto.

The road does a large interchange business with other



to increase over a period of years, but in the last five months of 1926 the tonnage moved to Vancouver was but 55 per cent of the volume of the same period in the previous year. The eastbound grain is loaded on boats at Fort William or Port Arthur and makes the trip to Buffalo or some other eastern lake port by water. Thence most of it again moves eastward by rail. Of this latter rail movement, however, the United States railroads se-

lines at the Niagara frontier and in the Detroit area. A large part of the United States coal which enters the Central region of Canada comes in through these gateways. Further east there are connections with the New York Central, the Delaware & Hudson and the New England roads and many with the Northwestern United States lines along the Manitoba border and on the Pacific Coast.

An interesting class of traffic, of which a considerable volume is handled, is fish. Much of this moves as express, but a considerable quantity is handled as freight, but at schedules approximating those of passenger trains. The business moves in both directions and from coast to coast. There is quite a volume also from Lake Winnipeg, whence come the famous "Lake Winnipeg gold-eyes." There is also a considerable milk traffic, much of which is international in character.

Pulpwood ranks high in volume among the various commodities handled. The bulk of this originates in the Province of Quebec, but there is some from other sections, particularly the Maritimes.

In 1926 the Canadian National handled 63,568,779 tons of revenue freight, as compared with 57,648,158 tons in 1925. The principal increase was in products of mines, approximately 3,000,000 tons, and under this head the chief increase was in clay, gravel, sand and crushed stone—indicating greater building activity. An increase of about 1,000,000 tons of coal handled is indicative of improved industrial activity, and this was reflected by an increase of almost 2,000,000 tons in the volume of manufactures handled. Grain tonnage likewise increased about 417,789 tons. The total tonnage handled in 1926 was distributed as follows:

|                                     |                   | Percentage of total |
|-------------------------------------|-------------------|---------------------|
| Products of agriculture.....        | 12,740,067        | 20.04               |
| Products of animals.....            | 1,570,633         | 2.47                |
| Products of mines.....              | 21,853,981        | 34.38               |
| Products of forests.....            | 10,403,403        | 16.37               |
| Manufactures and miscellaneous..... | 17,000,695        | 26.74               |
| <b>Total.....</b>                   | <b>63,568,779</b> | <b>100.00</b>       |
| Wheat.....                          | 6,215,751         | 9.78                |
| Coal.....                           | 12,952,178        | 20.38               |
| Pulpwood.....                       | 2,810,432         | 4.42                |

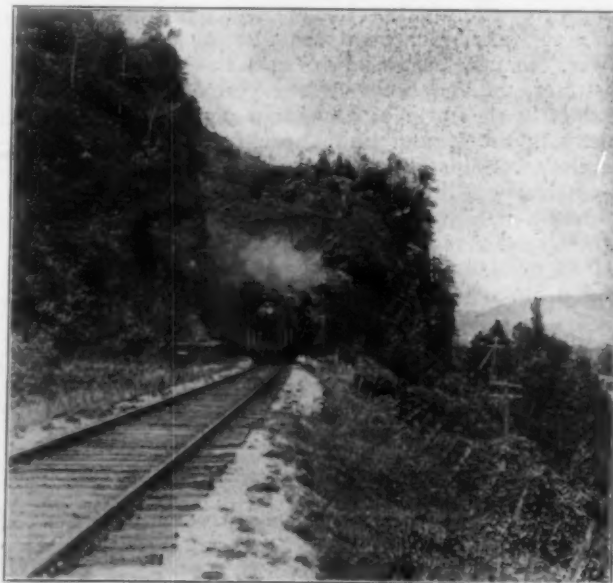
Ton-miles of revenue freight in 1926 totaled 19,812,953,935, as against 18,527,148,862 in 1925. The total freight revenue was \$207,157,028 in 1926; \$187,763,637 in 1925. Revenue per ton-mile showed a slight increase, namely, from 1.013 cents in 1925 to 1.046 cents in 1926—this increase coming from an improvement in the volume of the higher grades of traffic and not from any increase in rates. The average haul in freight service was 311.68 miles, as against 321.38 in the preceding year.

#### Rates and Traffic Density

The question of freight rates in Canada is very complex and is the subject of a thorough-going investigation at the hands of the Dominion Board of Railway Commissioners, which has already devoted two years to the task. Hearings before this board, together with other rate developments—the famous Crow's Nest Pass case with its complications, the 20 per cent reduction in the Maritimes, etc.—have been dealt with currently in the

*Railway Age*. Almost the only concise, yet meaningful, statement which can be used to characterize rates in Canada is that, generally speaking, they are lower than rates in any other part of the world, the United States included.

The revenue per ton-mile on the C. N. R. in 1926 was, as stated previously, 1.046. In the United States during the same period the average for all roads was 1.082. Traffic density, i.e., ton-miles, all freight, per mile of line in 1926, was less than half the United States average of 2,076,000, being but 968,000. When this sparseness of traffic, combined with the lower average receipts per ton-

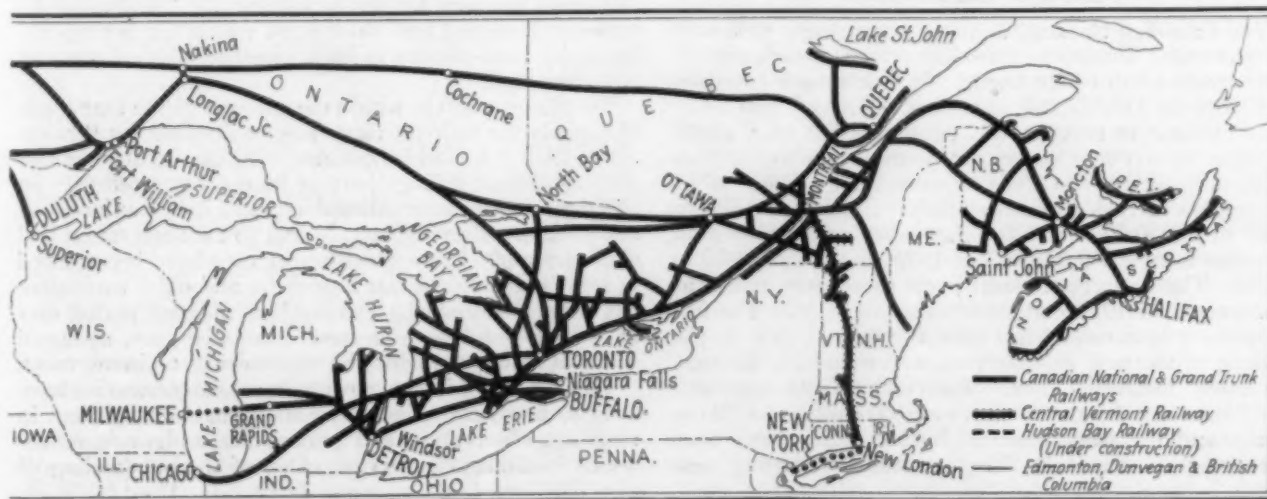


The "Ocean Limited" Emerging from a Tunnel in New Brunswick

mile, is considered, the problem the Canadian National management faces in earning interest on legitimate investment alone becomes apparent, without considering any additional charges for interest to cover past deficits.

#### Traffic Developing on Light Traffic Lines

Probably the greatest difficulty which the C. N. R. experiences in bringing up its earnings is its large mileage of lines built for development purposes and far beyond traffic demands. One of the outstanding examples of such a line is the National Transcontinental, following the northern route from the head of the lakes to





Quebec City. This line was built originally not because anyone thought the road that operated it would grow immediately rich, but rather because the Western farmers wanted a more direct all-rail route to tidewater for their grain and Quebec wanted this export business. The road was built, but the grain continued to move by the rail-lake route. Result: Another large non-productive capital charge against the C. N. R. Indicative of what may happen on the line of thinnest traffic if one has the patience to wait, things are now beginning to pick up. One of the greatest new industrial developments in Canada is going on along this line, namely in the Lake St. John territory. Here \$100,000,000 is now being invested in hydro-electric development, paper mills and a vast aluminum plant, the latter attracted by cheap power. Bauxite ore is shipped in to this plant (5 months by water, the remainder of the year by rail) and the product in the form of aluminum pigs is shipped out, mostly to the United States, for further manufacture. Developments of this character on other C. N. R. lines of extremely light traffic may be expected eventually.

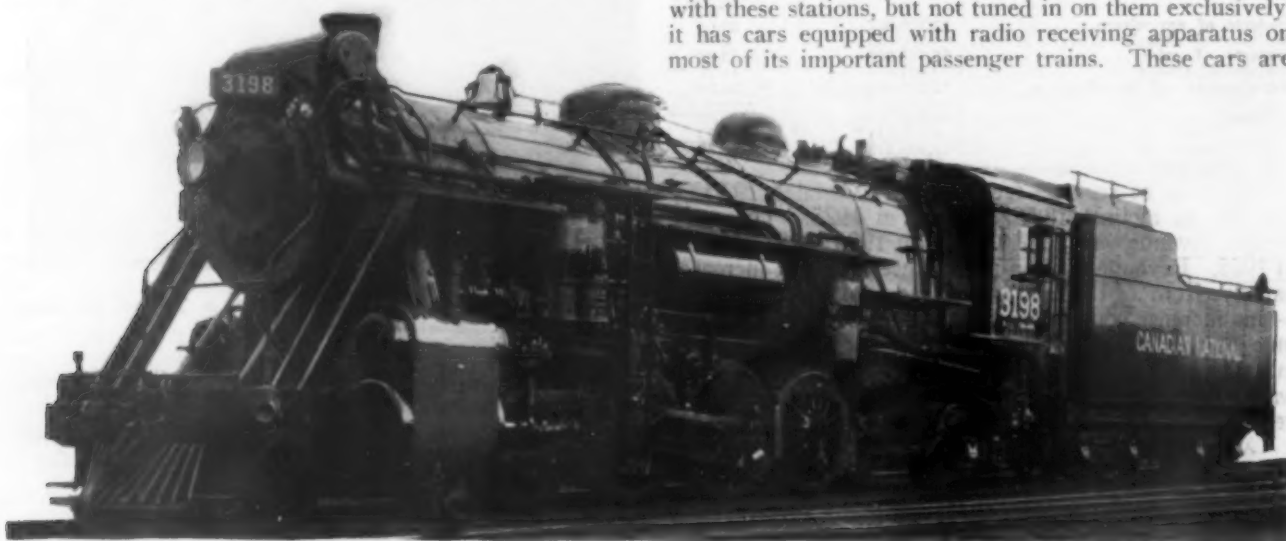
Canada is a country with a population of about 9,000,000 and a railway mileage of somewhat more than 40,000, or about 4.4 miles per 1,000 inhabitants. The United States, which, as is generally recognized, is well

trains to the service has been continued this spring with the "Acadian" from Montreal to Halifax; the "Maple Leaf" between Toronto and Chicago; and the "Confederation" (commemorating Canada's sixtieth birthday) between Toronto and the Pacific Coast.

Short haul traffic is being lost to private automobiles and buses, but not to the same extent as heretofore. To handle its local traffic more economically the Canadian National and Central Vermont have approximately 30 rail motor cars in operation, making an annual mileage of approximately 1,540,074. Additional cars now being placed in service will bring the annual rail motor car mileage up to approximately 1,935,220. The road has found the rail motor car to be of great service in effecting economies and in providing more frequent service without increased expense, which tends greatly to increase passenger revenues.

#### Company a Large Radio Broadcaster

The Canadian National in line with its public relations policy, its interest in attracting traffic and its responsibility to the Canadian people as a great public institution operates the largest chain of radio broadcasting stations in Canada, 11 in all, located in various parts of the country from the Atlantic to the Pacific. In conjunction with these stations, but not tuned in on them exclusively, it has cars equipped with radio receiving apparatus on most of its important passenger trains. These cars are



A C. N. R. Heavy Freight Locomotive

provided with railroads, has only about 2.5 miles per 1,000 of population.

#### Passenger Traffic Good

The Canadian National is doing surprisingly well with its passenger business, considering the experience of most roads south of the border. Its passenger revenues in 1926 were \$39,427,264, as against \$37,963,479 in 1925. This increase in revenue was accounted for by a slight increase in average passenger journeys, namely from 63.36 miles in 1925 to 66.44 miles in 1926. The total of passengers carried declined slightly—from 22,372,724 in 1925 to 22,240,390 in 1926. Passenger miles showed an increase from 1,417,635,163 in 1925 to 1,477,755,975 in 1926. The average revenue per passenger mile was 2.678 cents in 1925 and 2.668 cents in 1926. The improvement in earnings has been ascribed largely to the success of the new de luxe train service which the road has lately installed. The "Montrealer-Washingtonian," the "Intercity Limited" (between Toronto and Montreal) and the new Montreal-Boston trains have been particularly successful. The program of adding new

equipped with head-phones, so that the passenger may avail himself of radio entertainment if he desires. The company has recently received two parlor cars from the Pullman Company for the service on the "Ambassador" between Montreal and Boston, in which the wiring for the radio head-phones is built into the body of the car and concealed.

For routes entirely within the confines of the Dominion of Canada the railroad runs its own sleeping car service. Since 1923 it has added 60 new steel cars to this service and has rebuilt a large part of its older equipment. In addition, for its international service, it has secured 65 new Pullman sleeping cars. Eleven new observation and club cars and 11 new steel tourist cars have been placed in service during the last four years and older equipment has been modernized. Twenty-four all-steel parlor cars have been purchased, as have 7 colonist cars, equipped with lunch counters for the convenience of immigrants.

Many detailed improvements in passenger service have been made recently, including additional conveniences in sleeping, observation and parlor cars and more refinements in dining car service. One of the outstanding of



the latter is the provision of high chairs for small children in the dining cars and menu cards featuring children's foods exclusively.

The company maintains tourist accommodations at a number of resorts of interest to vacationists. These include hotels, bungalows, recreation buildings, golf courses, swimming pools, etc. It will add to its hotel properties this year by building a large new hotel at Toronto and by constructing a substantial addition to its Chateau Laurier at Ottawa.

#### Choice of Facilities After Amalgamation

With the amalgamation of the Canadian National Railways under the present management considerable savings were effected by the joint use of facilities before available only to the separate companies. Little mileage was abandoned, but the company took advantage of a choice of facilities, parallel lines for instance, by utilizing the more

serious factors had their bearing on this improvement, among them importantly the decreasing cost of locomotive fuel, its more efficient use and heavier train loading.

In 1923 the average cost of locomotive fuel on the locomotive tender was \$5.79 a ton. This decreased in 1924 to \$5.34; in 1925 to \$5.05 and in 1926 to \$4.59. These prices may seem high compared with usual American standard—and they are. They are accounted for by the fact that in Canada there is no native coal between Nova Scotia and New Brunswick in the extreme East and Alberta in the West, 2,600 miles. The Maritime coal moves westward for some distance and the western coal penetrates as far east as Winnipeg, but in the intervening area supplies are generally received from mines in the United States.

#### Operating Statistics

The year 1926 was the first one in which accounts of the Canadian National System were combined. Before that the figures of the Central Vermont were reported separately. The Bureau of Statistics of the railroad, however, has revised the fiscal figures insofar as practicable and it is these revised figures, including the Central Vermont totals, which have been used in this article. However, the inclusion of Central Vermont figures in the operating statistics has not been completed by the bureau and these units, now to be referred to, exclude that road.

Along with lower prices for coal came greater efficiency in its use. In 1923 the pounds consumed for each 1,000 gross ton-miles exclusive of locomotive and tender were 153 (excluding the Central Vermont). In 1924 this figure was reduced to 145; in 1925 to 137; and in 1926 to 135. For this latter year the average for Class I roads in the United States was 155.

Other operating statistics bear further witness to the general increase in efficiency. Gross tons per train show the following progression from 1923 to 1926 inclusive: 1238, 1273, 1329 and 1360. Net tons per train mounted in the same period as follows: 561, 568, 586 and 595. The 1926 figures for Class I roads in the United States were 1737 for the gross tons and 772 for net tons, a comparison into which lighter traffic density on the C. N. R. undoubtedly enters largely. Gross ton-miles per train hour on the C. N. R. went up from 15,445 in 1923 to 16,793 in the following year; 18,121 in 1925; and 18,784 in 1926, which last figure compares with 20,705 for the United States roads. The fact that this figure is so much nearer the United States average than that of gross tons per train is explained by the C. N. R.'s greater train speed, i.e. 13.0 miles per hour as against 11.9 in the United States. Car miles per car day were 24.7 in 1922; 26 in 1923; 24.7 in 1924; 26 in 1925; and 27.6 in 1926.

The average load per car in 1923 was 25.6; in 1924, 24.9; in 1925, 24.7; and in 1926, 24.6—registering in common with roads south of the border a slight decline.

A peculiar factor entering into the average load per car along the lines of the Canadian National may be worthy of note, viz., a considerable proportion of light capacity cars—60,000 lb. and even 40,000 lb., which are in service. The railway finds it necessary on account of the seasonal character of the grain traffic to maintain 10,000 box cars which lie idle except in the grain season. It has been found that for a considerable propor-



A Reminder of the Earlier Days—A Grand Trunk Train in Ontario

advantageously located and more economical for the bulk of the traffic. As a specific example: From Winnipeg eastward to a point above Lake Superior the old Grand Trunk Pacific line was by far the more direct. East of this point the former Canadian Northern Line was more advantageous. The construction of a short connecting line (the "Long Lac cut-off") at this point enabled the

Canadian National Railways  
(Excluding the Central Vermont)

| Item  | 1926       | 1923       | Per cent of Increase |
|---|------------|------------|----------------------|
| Average mileage operated.....   | 22,065.91  | 21,805.14  | 1.20                 |
| Gross ton miles (thousands).....  | 47,899,613 | 45,731,916 | 4.74                 |
| Net ton miles.....  | 20,966,131 | 20,726,149 | 1.16                 |
| Freight train miles (thousands) (incl. ppn. mixed and special).....           | 35,226     | 36,943     | *4.65                |
| Freight locomotive miles (thousands) (incl. ppn. mixed and special).....      | 40,299     | 42,381     | 4.91                 |
| Freight car miles (thousands) trans.....                                      | 1,306,800  | 1,239,848  | 5.40                 |
| Freight train hours.....  | 2,495,448  | 2,895,095  | 13.80                |
| Tons of coal consumed by frt. locos.....                                      | 3,228,542  | 3,464,178  | 6.80                 |
| Car miles per (car) day (All cars).....                                       | 27.6       | 26.0       | 6.15                 |
| Net tons per loaded car.....  | 24.55      | 25.59      | 4.06                 |
| Per cent loaded to total car miles.....                                       | 66.36      | 66.03      | 0.50                 |
| Net ton miles per car day (All cars).....                                     | 445        | 434        | 2.44                 |
| Freight cars per train (incl. caboose).....                                   | 37.4       | 34.1       | 9.68                 |
| Gross tons per train.....   | 1,360      | 1,238      | 9.85                 |
| Net tons per train.....   | 595        | 561        | 6.06                 |
| Train speed-miles per train hour.....   | 13.0       | 11.8       | 10.17                |
| Gross ton miles per train hour (excl. mixed and yard transfers).....          | 18,784     | 15,445     | 21.62                |
| Net ton miles per train hour (excl. mixed and yard transfers).....            | 8,227      | 7,010      | 17.36                |
| Lbs. coal per 1,000 gross ton miles.....                                      | 135        | 153        | 11.76                |
| Loco. miles per loco. day (All frt. locos. incl. ppn. mixed and special)..... | 69.58      | 70.95      | 1.93                 |
| Per cent freight locos. unserviceable (including mixed).....                  | 20.3       | 25.3       | 19.76                |
| Per cent freight cars unserviceable.....                                      | 6.8        | 6.2        | 9.68                 |

\* Italics denote decrease.

Bureau of Statistics, Canadian National Railways.

more economical lines—east and west—to be used, effecting considerable savings.

In 1922 the ratio of transportation expenses to gross earnings was 49.06 (entire system, including Central Vermont). In the succeeding years this was reduced to 47.66, 46.71 and 43.51 down to 40.43 in 1926. Va-

tion of this traffic a car of 80,000 lb. capacity is wasteful. Much of this grain is loaded across the platform by the farmers themselves and, often, a 40,000-lb. car is all the individual farmer requires. To purchase new and heavier cars, therefore, for a traffic to which a smaller car is well suited and, moreover, which lasts only a few months out of the year it was decided would be an unwarranted waste. With grain as important a factor in total traffic as it is, this light loading undoubtedly tends to affect the average loading per car on the system.

#### Maintenance and New Equipment

The road has, since its amalgamation, maintained a consistent policy of adequate maintenance. In 1926, a normal year in this respect, 8,627,505 new ties were inserted in track—of which 25 per cent were treated. Of 648 track miles of new rail laid during the year, 201 miles were of 100-lb. section, 20 of 90-lb. and 427 of 80-lb. In addition 430 miles of relay were put down. A total of 60 miles, double track, was rock ballasted.

The C. N. R. has automatic block signals on 275 miles of double track and 228 miles of single track. During 1927 it will install automatic signals on an additional 57 miles of double track.

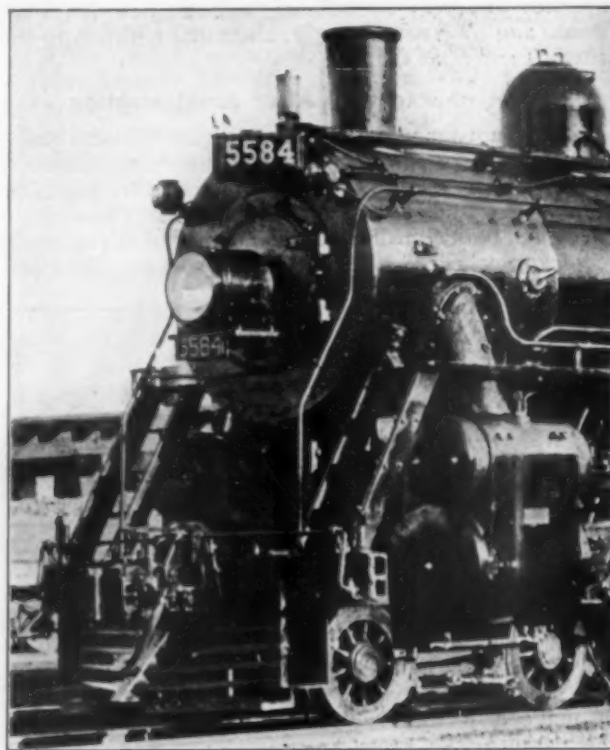
Immediately following the amalgamation of the roads under the new management steps were taken to improve its rolling stock and motive power situation by the purchase of modern equipment and in 1923 and 1924 a total of 81 locomotives, 267 passenger train cars and 7,400 freight cars were purchased. During the next two years the purchases of new equipment were relatively light, although a consistent program of modernization of older equipment was continued. Since the beginning of the current year, however, the company has renewed its purchases of equipment, having placed orders for 66 locomotives, 75 passenger train cars and 3,000 freight cars.

In its 1927 modernization program, it is applying steel underframes to its wooden mail cars and to several tourist cars and is steel plating a number of steel underframe tourist cars, parlor cars and coaches. It is rebuilding 1,000 general service cars and 500 fifty-ton hopper cars. In addition 500 steel hopper cars are being given a general overhauling, reinforcing the center sills.

With its locomotives similarly the company is pursuing a consistent policy of modernization to increase their efficiency and fuel economy. Of the total of 3,076

#### Employee Relations

Relations of the company with its employees have, on the whole, been happy. There has been a vast improvement in morale since the various lines were amalgamated under the new management. Some two years ago the so-called Baltimore & Ohio co-operative plan



C. N. R. Locomotive with Whistle Mounted in Front of Stack for Purposes of Experiment

was adopted for the company's shops in conjunction with the railway employees' department of the American Federation of Labor. This plan, the company says, has worked with much satisfaction and a study is now being made to determine the practicability of extending a similar movement to employees of the maintenance of way department. The end of 1926 and the beginning of 1927 marked a more or less concerted drive of the various classes of employees for increases in wages. Practically all of these requests have been met by the granting of increases which will entail considerable expense, but the company expresses its belief that the money so spent will in the course of time be saved through improved good feeling and consequent increased efficiency.

#### Ancillary Services

The Canadian National has a wide variety of subsidiary corporations, among them an express company, a commercial telegraph company, several steam railroad lines, several electric railway lines and the Canadian Government Merchant Marine. Among the subsidiaries is a large drydock and shipyard at Prince Rupert, an important terminal warehouse at Montreal and a chain of modern hotels.

The Canadian National in common with the Canadian



The "Continental Limited" Leaving Vancouver

locomotives on the system the various modernizing improvements have been applied as follows:

| Item  | No. Applied |
|---|-------------|
| Superheaters .....                          | 2,620       |
| Stokers .....                               | 280         |
| Feedwater Heaters .....                     | 308         |
| Syphons .....                               | 68          |
| Boosters .....                              | 53          |
| "World Ashcroft" Cut-off Control Gages..... | 250         |



Pacific co-operates closely with the Dominion government in its colonization activity. In 1926 it brought over 31,536 settlers from Europe, registering a vast improvement over the 1925 total which was 9,582.

### Financial Structure a Perplexing Problem

As was indicated in the early part of this article, an examination of the balance sheet of the Canadian National Railways is not particularly illuminating for persons who are accustomed to studying the balance sheets of commercial companies only. The statement includes an extremely heavy investment in road and equipment, namely \$1,886,449,586, which represents sums poured into the construction of the Grand Trunk Pacific, the Canadian Northern and the National Transcontinental during a period of rising costs. On the liability side, this investment is more than matched by securities of a face value of \$935,383,109 in the hands of the public and by a Dominion of Canada account of \$1,225,663,756 representing loans from the government in behalf of the



Cold Storage Plant for Halibut at Prince Rupert, B. C.

various railways and interest accrued, but unearned and consequently unpaid. The profit and loss account in the balance sheet shows a deficit of \$408,940,673. The property, if these figures were taken as they stand, would be plainly insolvent. However, there are circumstances which explain and mollify such a judgment. Years ago, prior to the completion of the first transcontinental railroad in Canada, the government was similarly involved in railroad construction. The line it built it turned over to the Canadian Pacific together with some cash and much land. The government did not continue to hold the Canadian Pacific liable for the money it had spent in this construction. Nor should it have done so. The risk of building a new railroad line through difficult country which is virtually uninhabited and the almost certain inadequate earnings for a period of years often make it necessary for such construction to be subsidized in some way, if it is to be undertaken at all. This practice was, as every one knows, common in the United States years ago and then, as now in Canada, even with such subsidies these new lines often got into financial difficulties. Some portions of Canada now served by the Canadian National are quite as much virgin frontiers as those entered by American roads 50 years ago. If Canadian government funds which have been sunk into C. N. R. lines were written off by the government—as undoubtedly they will be at some time—leaving only a charge commensurate with the railroad's importance as a commercial undertaking, then the showing of the Canadian National Railways could be fairly compared with that of other railroads. At the

present time, however, the most that can be said is that government stimulation of railroad construction beyond the demands of probable traffic—in other words taking railroad construction out of the realm of business and putting it into that statecraft and policies—is a tremendously costly policy. The Canadian people realize this and some think the expense justified, while others take the contrary view.

Whatever may be thought of such a policy—the wisdom of which is at least debatable—the piling of Ossa on Pelion and taking the government railroads thus constructed and operating them as an arm of the civil administration is certainly, from a railroad standpoint, to be condemned. And this mistake Canada is emphatically not making.

Canada had some small experience along this line with the old Intercolonial, the original government-owned line, but, in combining all the properties under the new management in 1922, it rectified the error by deciding to simulate a private corporation organized on commercial lines as its future government railroad structure.

The wisdom of this change of policy is plainly manifest. From an operating standpoint, where the Canadian National Railways resemble closely a private corporation, their record for improved efficiency has been magnificent. From the standpoint of the financial structure, into which government policy enters, there is still a tremendous problem to be solved.

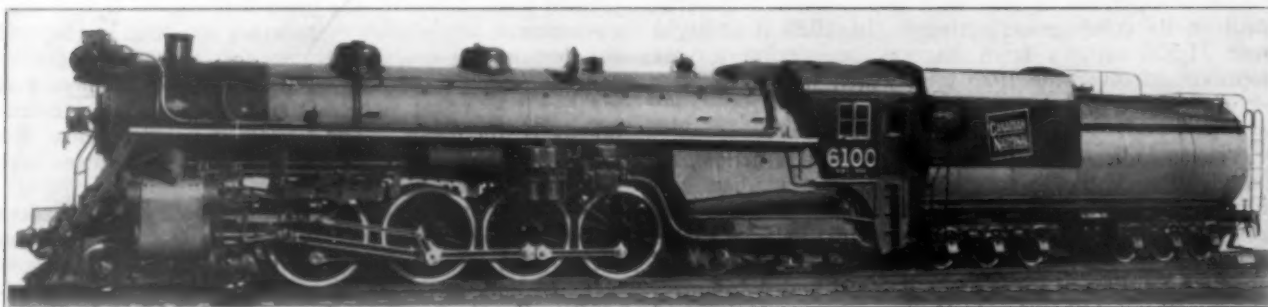
## A Message from Sir Henry Thornton

(Continued from page 1719)

the various colonies were firm and as a result the Intercolonial Railway was surveyed and built into two maritime provinces, giving direct access to the Port of Montreal and thence, via the Grand Trunk System to Ontario points, while subsequently the Canadian Pacific Railway was built across what was then the unsettled prairie land of Western Canada to Vancouver, in British Columbia.

It was a stupendous undertaking upon which these scattered colonies embarked, that of building two large railways systems, but they had faith in the future of their newly-formed Dominion of Canada and despite certain opposition, they did not falter. Nor was their judgment wrong. The untilled and little-known prairies gave birth to the provinces of Manitoba, Saskatchewan and Alberta and they became one of the richest farming sections of the world. It was in the upbuilding of these three provinces that the third era of railway building commenced. Originally the line from the east to the west was a single band of steel but the settlers spread far from its service. New lines again were urgently required. While the pioneer system provided many, others were also necessary. So it was that the Canadian Northern Railway and the Grand Trunk Pacific came into being and these two companies conceived and constructed transcontinental lines, with branch lines as feeders. Just what the future of these roads would have been is problematical, as they were likewise colonization roads; but outbreak of the world war gave them no opportunity to endeavor to weather their financial storms and the fourth era of railway history opened when the Dominion of Canada was forced to take them over to assure Canadian credit abroad. Out of the wreckage of these two systems was formed the Canadian National Railways and when, subsequently, the old Grand Trunk System became involved in financial difficulties it likewise was amalgamated with the National Systems.





The First Canadian National 4-8-4 Type Locomotive

## C.N.R. Buys 4-8-4 Type Locomotives

*Silicon steel boilers carry 250 lb. pressure—Main driver and truck journals have floating bushing bearings*

THE Canadian National has placed orders in Canada for 40 locomotives of the 4-8-4 type, 20 of which are being built by the Canadian Locomotive Company, Kingston, Ont., and 20 by the Montreal Locomotive Works. An additional 12 locomotives of this type are also being built by the American Locomotive Company in the United States for use on the Grand Trunk Western. These locomotives, which the railroad will designate the Northern type, will be used between Montreal, Que., and Sarnia, Ont., in passenger and manifest freight service, while the 12 locomotives on the Grand Trunk Western will be used in similar service between Sarnia and Chicago. It is intended to use them on extended runs over two or more regular divisions.

The first of these locomotives will be delivered by the Canadian Locomotive Company during the first week in June, and it will be on exhibit at the Bonaventure passenger station of the Canadian National Railways, Montreal, during the convention of the Mechanical Division of the American Railway Association, June 7 to 10, inclusive.

There are several features of unusual interest in these locomotives, the two most important of which are the use of special steel in the boiler to permit raising the boiler pressure without materially increasing the weight, and the other is a floating bushing main driving box, the design of which departs radically from the customary crown brass type.

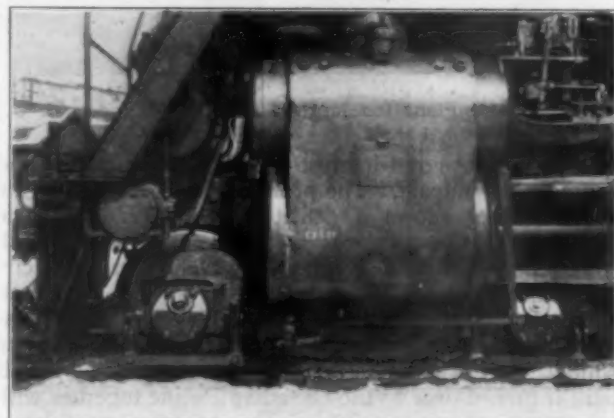
The shell courses of the boiler are made of a high tensile silicon steel developed by the Carnegie Steel Company and having a tensile strength ranging between 70,000 and 83,000 lb. and a minimum yield point of 38,000 lb. Silicon is the principal factor employed in obtaining the high elastic limit and the high ductility characteristics of this steel. While certain manufacturing problems, including the addition of the necessary silicon, result in an added cost of making the silicon steel, there is no mystery in the process. It can be made by the usual basic open-hearth method, the silicon being added while the steel is being tapped.

The minimum tensile strength specified for the Canadian National boiler plates is 10,000 lb. less than the mill's standard grade of silicon steel and its carbon and silicon limits are slightly lower. The average results of 350 tests are as follows:

|                         |               |
|-------------------------|---------------|
| Tensile strength .....  | 76,811 lb.    |
| Yield point .....       | 46,146 lb.    |
| Elongation .....        | 25.2 per cent |
| Reduction in area ..... | 47.1 per cent |

The use of this steel permitted the construction of the barrel of the boiler to carry a steam pressure of 250 lb. with no added weight as compared with a similar boiler of carbon steel plates to carry 200 lb. pressure.

The boiler is of the straight top type, with a radial stayed firebox. Steel staybolts are used throughout and



The Engine Truck, Equipped with Floating Bushing Journal Boxes

the flexible bolts are of the F.B.C. welded telltale type. The tube sheet layout is designed for the Type E superheater with 177 3½-in. flues and 27 2¼-in. tubes. Superheater units are included in 162 of the 3½-in. flues. The firebox has a grate area of 84.4 sq. ft. and a combustion chamber extends 48½ in. into the barrel. The brick arch is carried on three 3-in. arch tubes and two Nicholson thermic syphons. An additional syphon is located in the combustion chamber.

All of the engines are equipped with type D1 Duplex stokers and Elesco type K-39 feedwater heaters, with the C.F. pumps. American multiple throttles are also used on all of the locomotives. The engines built at Montreal are equipped with the Shoemaker fire doors and with cast steel grates, without power grate shakers. The Kingston-built engines have Franklin fire doors and

Franklin power grate shakers, with grates of cast iron.

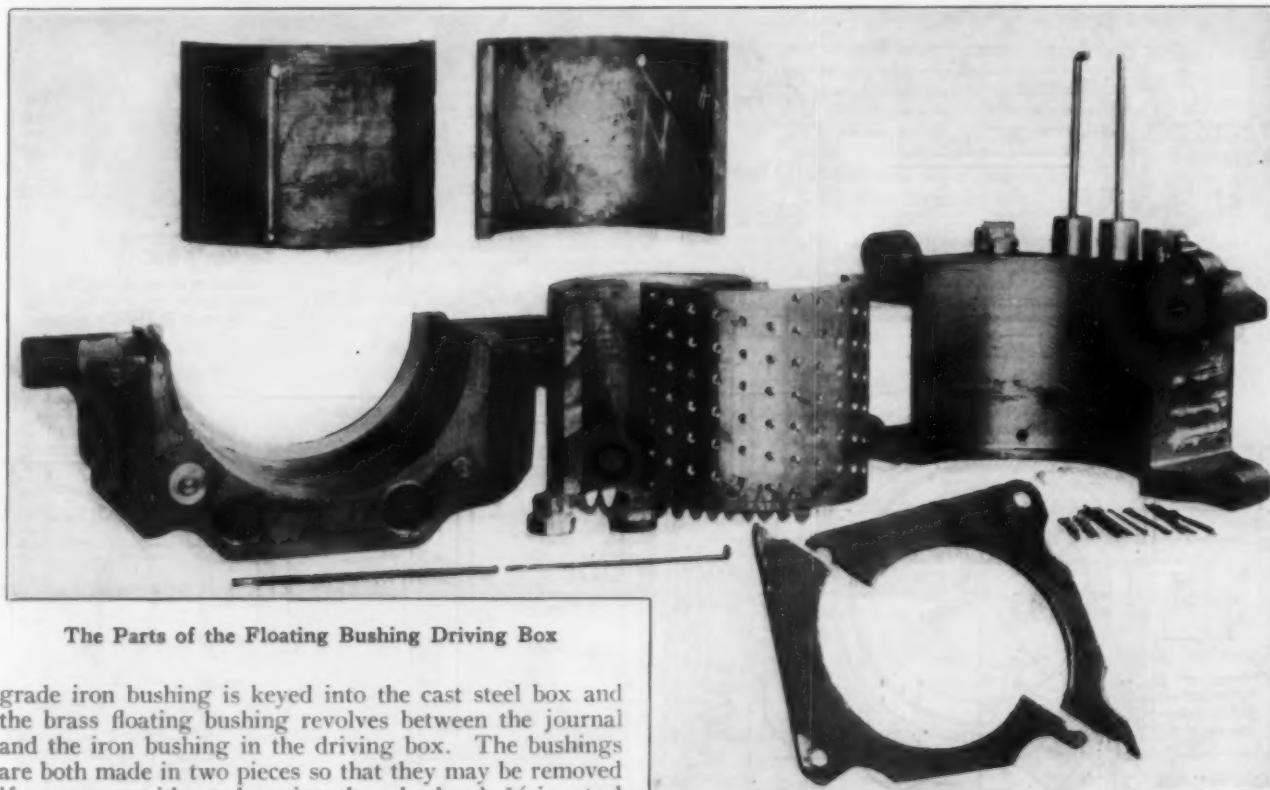
All of the driving boxes, with the exception of those on the main axle, are of the usual crown bearing type equipped with Franklin grease cellars and driving box spreaders. The main driving boxes are of a novel design which has been developed on the Canadian National and the Grand Trunk Western and which, prior to the building of the new locomotives, has been applied to the main drivers of a number of engines in both freight and passenger service. The results obtained in service from the operation of these boxes have been so satisfactory that these boxes are being applied on the main drivers of the entire lot of 52 new 4-8-4 type locomotives being built in Canada and the United States.

As shown in the illustration, the box\* is made of cast steel in two sections, parted horizontally and held together by four bolts of high tensile steel,  $1\frac{3}{8}$  in. in diameter. Two eyebolts are screwed into the top half of the box for convenience in lifting it off. A high

The life of the floating bushing for the driving boxes has not yet been fully determined. One engine, however, has made 40,000 miles with only  $1/64$  in. wear and it is expected to run from shopping to shopping. Another engine has made 25,000 miles with only three or four thousandths of an inch wear. If, however, the wear develops to such an extent that it becomes necessary to change the bushings, this becomes a roundhouse job which, it is said, can be done in one hour. Tapped holes are provided in the inside face of the floating bushing to facilitate its removal.

This design of box has eliminated pounding and has reduced to a very noticeable extent the amount of maintenance required on rods and has also provided a much larger continuous hub area than the conventional box design. The boxes are said to have run large mileages on one packing of grease and the cost of lubrication is very low.

The front drivers are equipped with lateral motion



The Parts of the Floating Bushing Driving Box

grade iron bushing is keyed into the cast steel box and the brass floating bushing revolves between the journal and the iron bushing in the driving box. The bushings are both made in two pieces so that they may be removed if necessary without dropping the wheel. A  $\frac{1}{2}$ -in. steel plate in the inside face of the box holds the bushing in place. The box is lubricated by the ordinary driving journal compound which is supplied to the bearing from four pockets, two at the top and two at the bottom of the box. The grease is carried from the pockets through holes and grooves in the iron bushing to the inner brass bearings. The brass bushing contains a large number of  $\frac{1}{4}$ -in. holes countersunk on the outside and full of grease. The grease from the two top pockets feeds the bearings when softened, but on the two bottom pockets a plunger is applied with a coil spring which will put some pressure on the grease and assist in feeding it. The grease pockets open on the inside face of the box and are each equipped with a plug. These plugs when screwed in are locked in pairs by two rods, each of which passes through two of the plugs. It is said to be a small job to remove these plugs and fill the pockets with grease.

\*This type of driving and truck box, covered by patents pending, is being manufactured in the United States by the Locomotive Finished Material Company, Atchison, Kans.—EDITOR.

devices, the Franklin type being applied on the Kingston-built locomotives and the Alco type on the Montreal-built locomotives. An interesting detail in the building of the locomotives is that all the axle journals are finished by grinding.

Another interesting feature in these locomotives is the four-wheel outside bearing engine truck. The journal boxes of this truck are also of the floating bushing type. Although they differ in construction from the main driving box, they are built on the same principle. The boxes for the truck are one-piece castings of Vanadium steel in which a bushing of high grade hard iron is pressed and between which and the journal the hard bronze bushing floats. A removable collar on the end of the axle holds the bearing in place and at the same time by its lateral movement pumps grease into the bearing. Space is provided for the grease inside the cover which is bolted on the outside face of the box. The cover contains a removable plug for applying the grease. A  $\frac{3}{8}$ -in. bronze

liner is applied on the inside face of the box and between this bronze liner and the inner end of the floating bushing, which in the truck boxes is a solid bushing, a felt ring in a brass container is applied to hold the grease in the box.

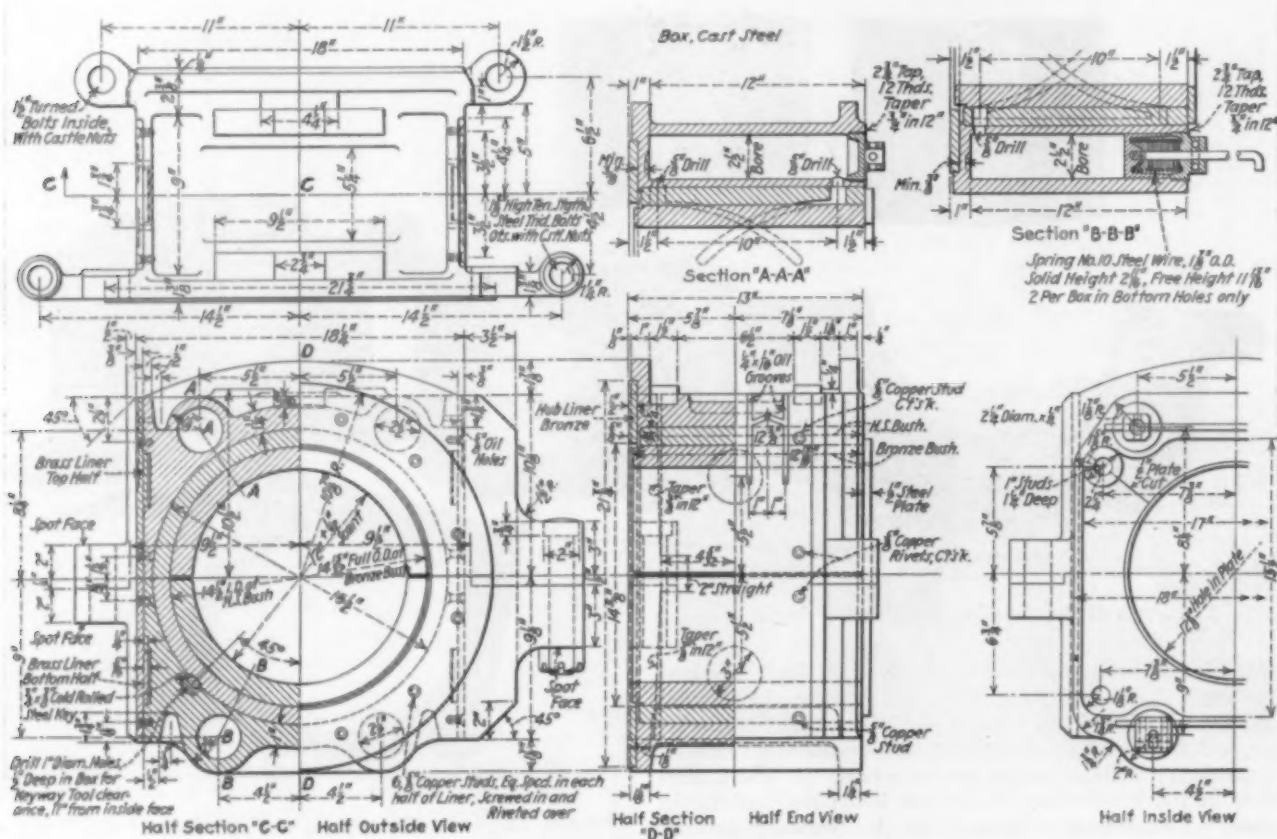
The spring arrangement on this truck is unusual. There are three semi-elliptic springs on each side, the center one acting as an equalizer while each of the other two is hung in the box in a spring seat which is cast integral with the box. The truck frame, with the bolster and the lateral resistance device is of Commonwealth design.

Three engine trucks of this design were applied to Canadian National 4-8-2 type locomotives, one of which has now been in service three years and the other two about nine months each. A fourth truck of this type was applied to a Grand Trunk 4-6-2 type locomotive. This has been in service about one year. These trucks have all shown a remarkable freedom from hot box

journals are also of the floating bushing type, grease lubricated.

Boosters are being applied to ten of the twenty locomotives which are being built at Kingston, but all of the trailing trucks are arranged so that boosters may be applied later. The design of the boxes and bearings of the trailer journals is essentially the same as those on the engine truck with the exception that the grease retaining rings are of bronze instead of felt.

The cylinders are of cast iron with Hunt-Spiller bushings for the cylinders and valve chests. The pistons, which are of the Canadian National standard built-up type, are also fitted with Hunt-Spiller bull rings. The back end of the main rod and the intermediate side rods are equipped with floating bushing bearings. The locomotives are equipped with Precision reverse gears and with Baker valve gear which give a maximum travel in forward motion of 9 in. The cylinders are lubricated by the Nathan mechanical type lubricator of 16 pints



Construction Details of the Floating Bushing Driving Box

troubles and have reduced the usual maintenance costs due to changing wheels, brasses, etc., and the packing of cellars. The grease used is similar to rod cup grease, but with a lower melting point. The wear on the bronze bearings is very slight and their life is estimated at 100,000 miles. A four-wheel truck with inside journals and floating bushing journal boxes similar to those on the main drivers is also in service on the Canadian National and giving good results. This design has been developed for application to the journals of existing engine trucks.

The trailing truck is of the Commonwealth four-wheel design with steel tired wheels 34 1/4 in. in diameter on the front axle, and 48 in. in diameter on the rear axle. The front axle has a total lateral of 1 1/4 in., while the rear axle the lateral is 3/8 in. The boxes on the trailer

capacity, suitable for long runs. The auxiliaries are lubricated with Detroit hydrostatic lubricators, with three or four feeds, depending on whether or not the locomotives are equipped with boosters.

Special steels are used in the construction of the locomotives in a number of other details besides the boiler shell.

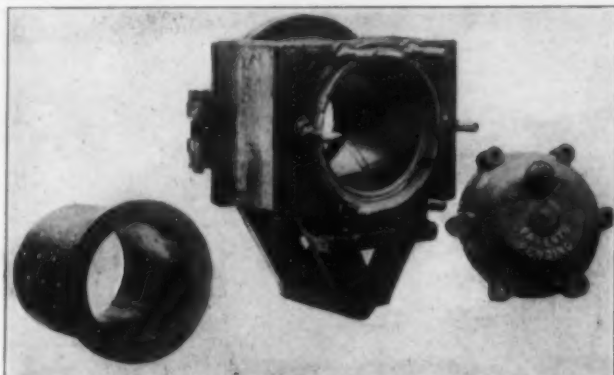
The main frames for both orders are half of nickel steel and half of Vanadium steel. The main axles, main crank pins, side and main rods and piston rods are all of nickel steel. Carbon steel is used for the springs, with the exception of the engine truck springs, which are of silico-manganese steel.

The cab is a short vestibule type of steel, wood lined. The turrets are located ahead of the cab. The left hand turret is supplied with superheated steam by a 3-in. pipe



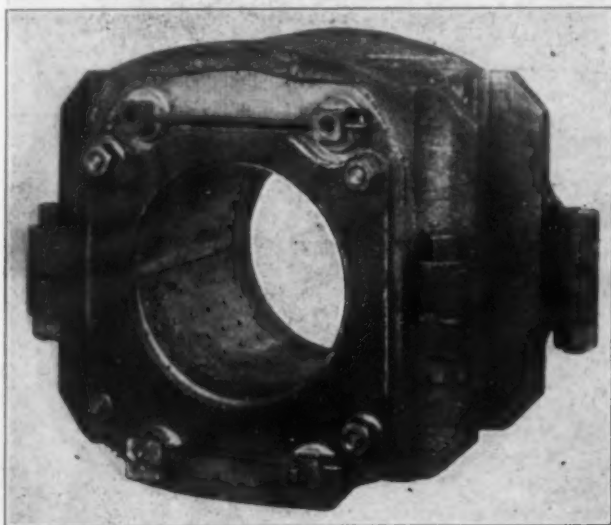
leading from a connection on the superheater header, while the right-hand turret is supplied with saturated steam from a direct connection to the boiler. Superheated steam is supplied to the air pump, feedwater heater pump, stoker and headlight generator, while saturated steam is supplied to steam heat line, inspirator, lubricator and other small auxiliaries.

The four-chime whistle is located on the left side of the smokebox near the stack, with a 1-in. connection to the superheated steam line from the header, and is operated by a wire cable carried through the handrail on the left side. Two blow-off valves are located on the



Parts of the Engine Truck Journal Box

right hand side of the firebox and can be operated in unison from the cab. Both blow-off cocks are connected to an L. & C. sludge remover. One has an internal pipe connection along the bottom of the barrel extending to within 2 ft. of the front tube sheet, while the other has a pipe connection across the throat with an opening opposite the side water legs. The side checks carry the feedwater through troughs on the inside of the barrel



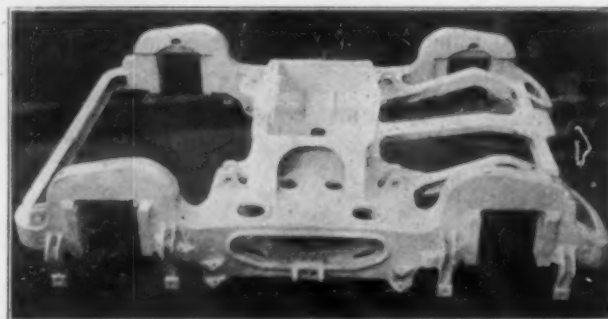
The Floating Bushing Main Driving Box

down near the bottom of the tubes so as to prevent deposits gathering on top of the tubes.

The front end is fitted with C. N. standard barrel netting and the exhaust tip is a steel insert in the end of the exhaust stand. The smokebox front is of pressed steel with a cast iron door. A Barco blower connection is applied on the left side of the smokebox.

A new feature has been introduced on these locomotives by the use of a common exhaust pipe on the left

side for the air pump, feedwater heater pump and stoker. This pipe is carried forward to a tee in the exhaust steam pipe leading from the exhaust passage in the cylinder side to the feedwater heater located on the top of the



The Frame Casting for the Outside Journal Box Engine Truck

smokebox. In the locomotives equipped with boosters, the exhaust from the booster is carried along the right side of the engine and into a tee in the right-hand exhaust pipe leading from the cylinder to the feedwater

#### Principal Dimensions, Weights and Proportions of the Canadian National 4-8-4 Locomotive

|  |   |                 |
|--|---|-----------------|
| Railroad   | C. N. R.  |                 |
| Type of locomotive                                     | 4-8-4   |                 |
| Service  | Pass. and manifest frt.                           |                 |
| Cylinders, diameter and stroke                         | 25 1/4 in. by 30 in.                              |                 |
| Valve gear, type                                       | Baker   |                 |
| Valves, piston type, size                              | 14 in.  |                 |
| Maximum travel   | 9 in.   |                 |
| Lap  | 1 1/4 in.   |                 |
| Exhaust clearance                                      | 1/4 in.   |                 |
| Lead   | 1/4 in.   |                 |
| Weights in working order:                              |   |                 |
|  | With booster                                      | Without booster |
| On drivers   | 232,000 lb.                                       | 230,000 lb.     |
| On front truck   | 65,000 lb.  | 65,000 lb.      |
| On trailing truck                                      | 91,000 lb.  | 83,000 lb.      |
| Total engine   | 388,000 lb.                                       | 378,000 lb.     |
| Tender   | 260,000 lb.                                       | 260,000 lb.     |
| Wheel bases:   |   |                 |
| Driving  | 19 ft. 6 in.                                      |                 |
| Total engine   | 43 ft. 10 in.                                     |                 |
| Total engine and tender                                | 82 ft. 0 in.                                      |                 |
| Wheels, diameter outside tires:                        |   |                 |
| Driving  | 73 in.  |                 |
| Front truck  | 34 1/4 in.  |                 |
| Trailing truck   | 34 1/2 in., front; 48 in., rear                   |                 |
| Journals, diameter and length:                         |   |                 |
| Driving, main  | 12 in. by 13 in.                                  |                 |
| Driving, others  | 10 in. by 13 in.                                  |                 |
| Engine truck   | 7 in. by 10 in.                                   |                 |
| Trailing truck   | { 7 in. by 12 in., front<br>9 in. by 14 in., rear |                 |
| Boiler:  |   |                 |
| Type   | Straight top                                      |                 |
| Steam pressure   | 250 lb.   |                 |
| Fuel, kind   | Bit. coal   |                 |
| Diameter, first ring, inside                           | 80 3/4 in.  |                 |
| Diameter, largest course, outside                      | 90 in.  |                 |
| Firebox, length and width                              | 126 1/4 in. by 96 1/4 in.                         |                 |
| Arch tubes, number and diameter                        | 3—3 in.; 2 syphons                                |                 |
| Combustion chamber length                              | 48 1/2 in.  |                 |
| Tubes, number and diameter                             | { 27—2 1/4 in.<br>15—3 1/2 in.                    |                 |
| Flues, number and diameter                             | 162—3 1/2 in.                                     |                 |
| Length over tube sheets                                | 21 ft. 6 in.                                      |                 |
| Grate area   | 84.4 sq. ft.                                      |                 |
| Heating surfaces:                                      |   |                 |
| Firebox and comb. chamber                              | 315 sq. ft.                                       |                 |
| Arch tubes and syphons                                 | 117 sq. ft.                                       |                 |
| Tubes and flues  | 3,814 sq. ft.                                     |                 |
| Total evaporative                                      | 4,256 sq. ft.                                     |                 |
| Superheating   | 1,700 sq. ft.                                     |                 |
| Comb. evaporative and superheating                     | 5,956 sq. ft.                                     |                 |
| Tender:  |   |                 |
| Style  | Vanderbilt  |                 |
| Water capacity   | 11,300 Imp. gal.                                  |                 |
| Fuel capacity  | 20 tons   |                 |
| General data estimated:                                |   |                 |
| Rated tractive force, engine                           | 56,800 lb.  |                 |
| Rated tractive force, engine and booster               | 67,700 lb.  |                 |
| Weight proportions:                                    |   |                 |
| Weight on drivers ÷ total weight engine, per cent      | 60  |                 |
| Weight on drivers ÷ tractive force                     | 4.05  |                 |
| Total weight engine ÷ comb. heat. surface              | 64  |                 |
| Boiler proportions:                                    |   |                 |
| Tractive force ÷ comb. heat. surface                   | 9.54  |                 |
| Tractive force × dia. drivers ÷ comb. heat. surface    | 695   |                 |
| Firebox heat. surface ÷ grate area                     | 5.12  |                 |
| Firebox heat. surface, per cent of evap. heat. surface | 10.1  |                 |
| Superheat. surface, per cent of evap. heat. surface    | 40  |                 |

heater. A special Crane check valve is applied to the booster exhaust line.

Among other special equipment is an Ashcroft cut-off control gage, and Huron arch tube and washout plugs. Cardwell draft gears are applied to the Kingston-built engines and Miner draft gears to the Montreal-built engines. The locomotives are all equipped with 8½-in. cross-compound compressors.

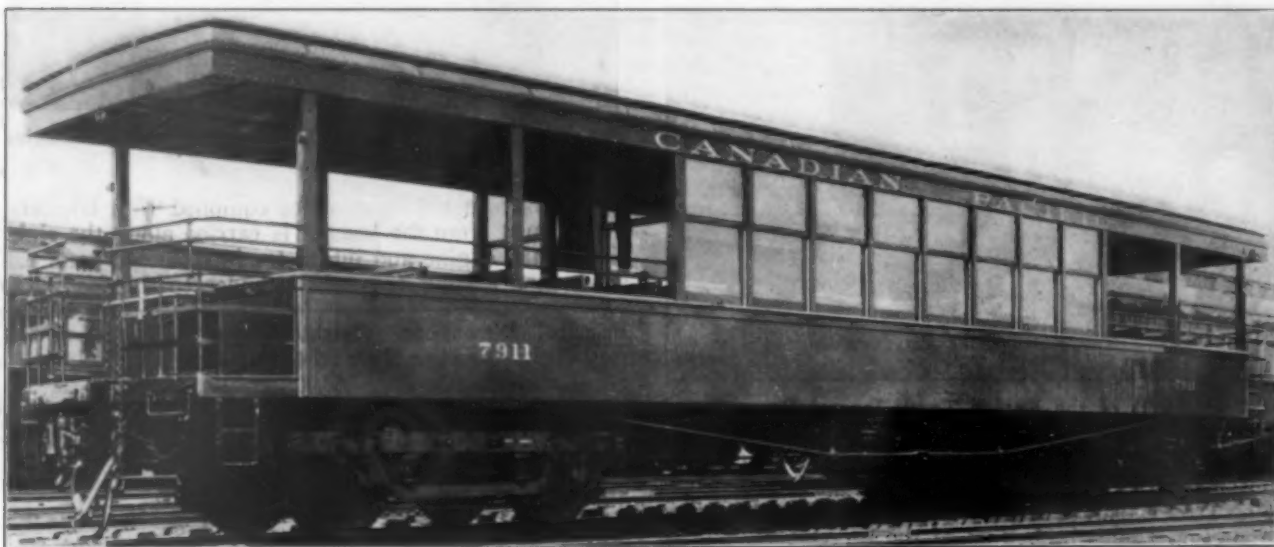
The tender frames are Commonwealth castings, while

the tanks are of the Vanderbilt type. The tenders are carried on Commonwealth steel trucks, with 6-in. by 11-in. journals with 34¼-in. steel tired wheels.

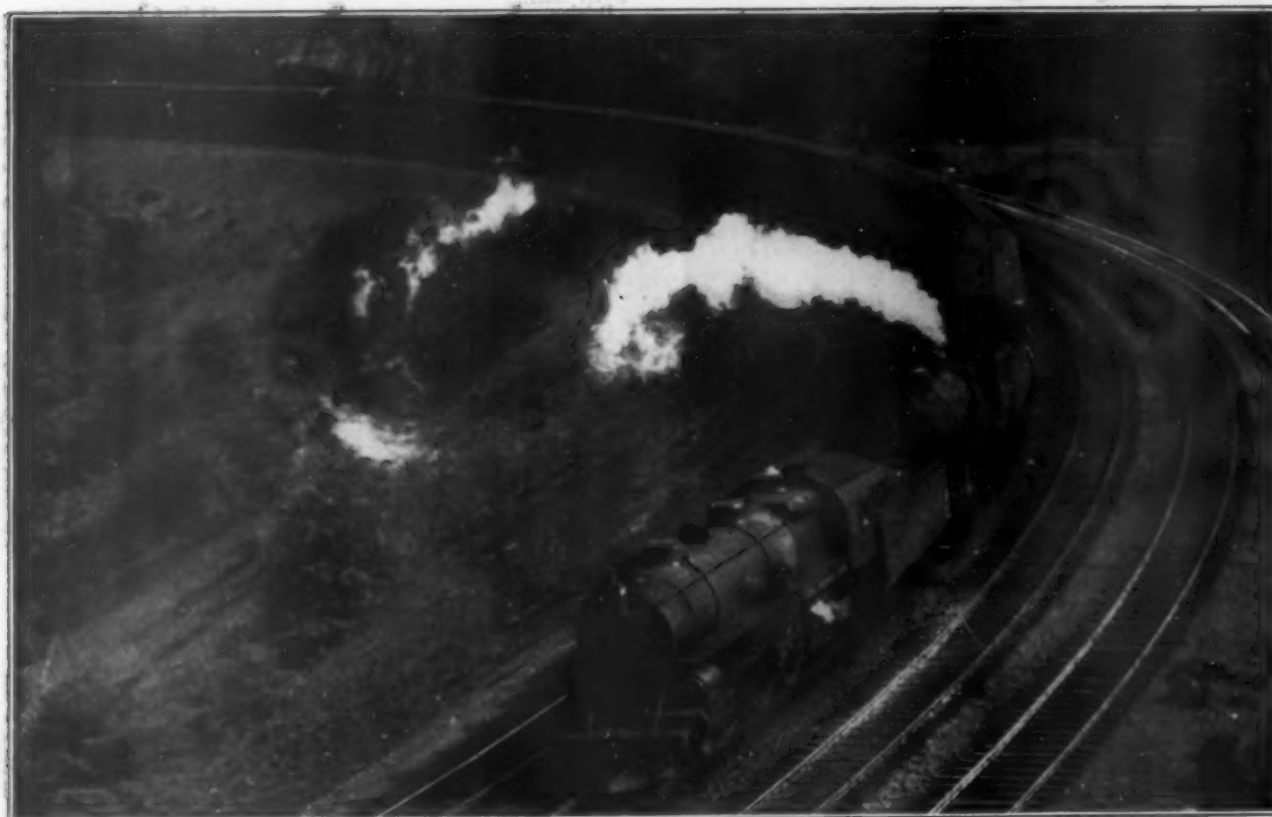
Departure has been made from the use of the customary black in the exterior finish of the locomotive. The boiler jackets of these locomotives are painted a dark gray.

The table gives the principal dimensions, weights and proportions of the 4-8-4 type locomotives.

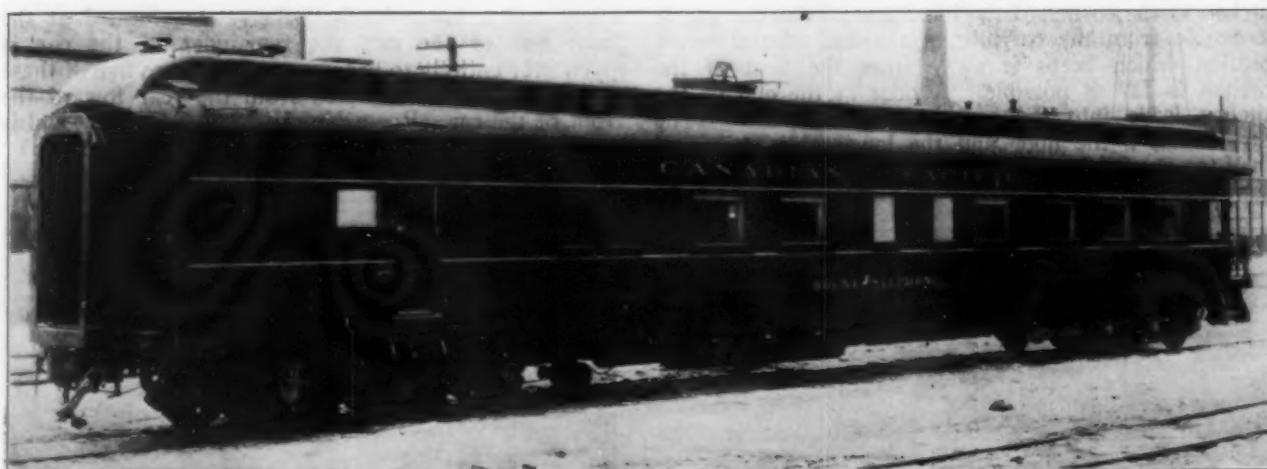
\* \* \* \*



New C. P. R. Observation Car for Use in the Rockies



"Keystone Express," P. R. R., on Horseshoe Curve West of Altoona, Pa.



*The Mount Stephen Has Large Observation and Dining Rooms and No Bedrooms*

## C. P. R. Builds Private Cars of Unusual Arrangement

*Steel structure with wood interior finish—Construction is typical of the road's passenger equipment*

THE Canadian Pacific has recently built two private cars of unusual design which have been laid out primarily to meet the requirements of special parties. The first of these cars was completed at the Angus shops of the railroad at Montreal, Que., December 23, 1926, in two months from the date the first order was placed with the shops and the orders placed for the first material. The second car was completed May 16, 1927.

The lounge room and dining room of the ordinary car are too small to provide comfortably for the requirements of some of the larger private car parties which the company is called upon to move from time to time. Accordingly, the Mt. Stephen, the car first completed, is laid out to provide for the daytime requirements of such parties, while in the Strathcona the greater part of the car has been given over to bedrooms with a small lounge, no dining room, and a kitchenette.

### Interior Arrangement of the Cars

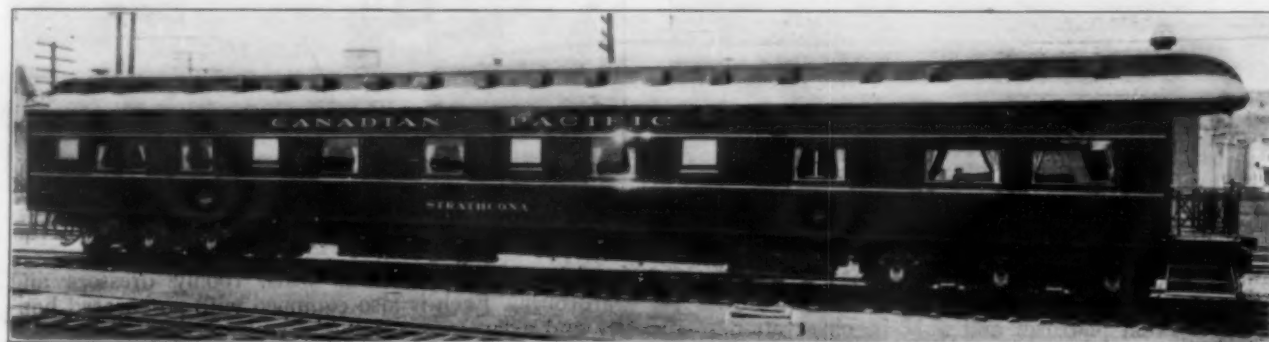
The Mt. Stephen, which has no staterooms, has a

deep observation platform measuring 6 ft. 3½ in. long inside the platform end sill. The observation room is about 20 ft. long and provides comfortable space for five chairs and two small tables on each side, with a sofa against the end bulkhead. Leading from the observation room to the dining room, a corridor passes an office and two toilet rooms opening from a small lateral corridor. The office is 6 ft. 3 in. in length by 6 ft. 10 in. wide and contains a small desk, a table and chairs.

The dining room is 15 ft. 6 in. long and extends the full width of the car. It is furnished with an extension table which will seat fourteen. The table is fitted with service buzzers at each end. Across each of the two outside corners is a small sideboard and china cabinet.

A corridor leads from the front of the dining room past the kitchen to the front end of the car. The kitchen, although not as large as a full size dining car kitchen, is much larger than the kitchen of the usual private car and is completely equipped with a range, iceboxes, sink, lockers and counters.

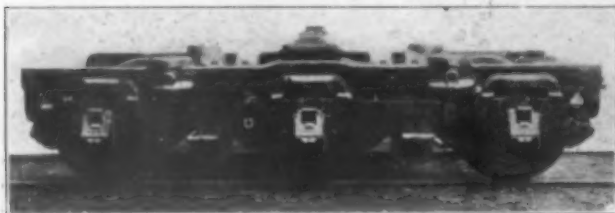
The main refrigerator is located in front of the



*The Strathcona Has a Small Observation Room and Five Bedrooms*



kitchen in the corner of the blind end of the car and is accessible from the corridor at the end of the car, a location which keeps it away from the heat of the kitchen as far as possible. A door at the end of the kitchen leads into the corridor at this point. The kitchen has a tile floor and the lower side walls and shelf top are finished in polished monel metal. A divided door leads from the corridor into the rear end of the



The Top Equalizer Six-Wheel Truck

kitchen. A folding shelf attached to the end wall can be dropped down to the top of the lower half of the door and, with the upper half open, this forms the service counter. The kitchen also has an outside door through which to receive supplies.

Between the kitchen and dining room, and accessible only from the kitchen, is a steward's room. This contains an upper and a lower berth, with a sofa bed on the



Interior of the Kitchen in the Mt. Stephen, Looking Toward the Corridor Door

side adjoining the corridor. These facilities, with a lavatory, a toilet in a small separate compartment and a wardrobe, provide comfortable accommodations for the steward and his assistants.

The companion car, the "Strathcona," has a 3-ft. 9½-in. observation platform and a 12-ft. observation room which accommodates five chairs, a settee and two small tables; a kitchenette, a steward's room containing an

upper and a lower berth, lockers, etc., located at the front end of the car, the remainder of the car is given over entirely to bedrooms. There are five of these rooms which are numbered from the rear toward the front of the car. Room No. 1 is 8 ft. 9 in. long and is



The Dining Room of the Mt. Stephen Has Large Seating Capacity

provided with a 3-ft. 6-in. bed placed across the car. This room is served with a completely equipped private bathroom 4 ft. 3 in. long. Rooms Nos. 2 and 3 are each 7 ft. 9 in. long and are furnished with 3-ft. 3-in. beds. The wardrobes and dressers in these rooms are somewhat smaller than those in room No. 1. They share the use of a completely equipped bathroom between them. This bathroom is also accessible from the corridor. Bedrooms Nos. 4 and 5 are 8 ft. 8 in. long and are similarly



The Observation Room of the Mt. Stephen

furnished with 3-ft. 3-in. beds, roomy dressers and wardrobes. Each is also equipped with an encased hopper and a lavatory. Between and accessible from each of them is a small bathroom.

Each of these cars is equipped with a hot water

heater enclosed in the front corner of the car at the end of the side corridor. These heaters are fitted with fuel magazines which are filled from the roof and from which the fuel bed of the heater, when it is in use, is replenished manually as required.

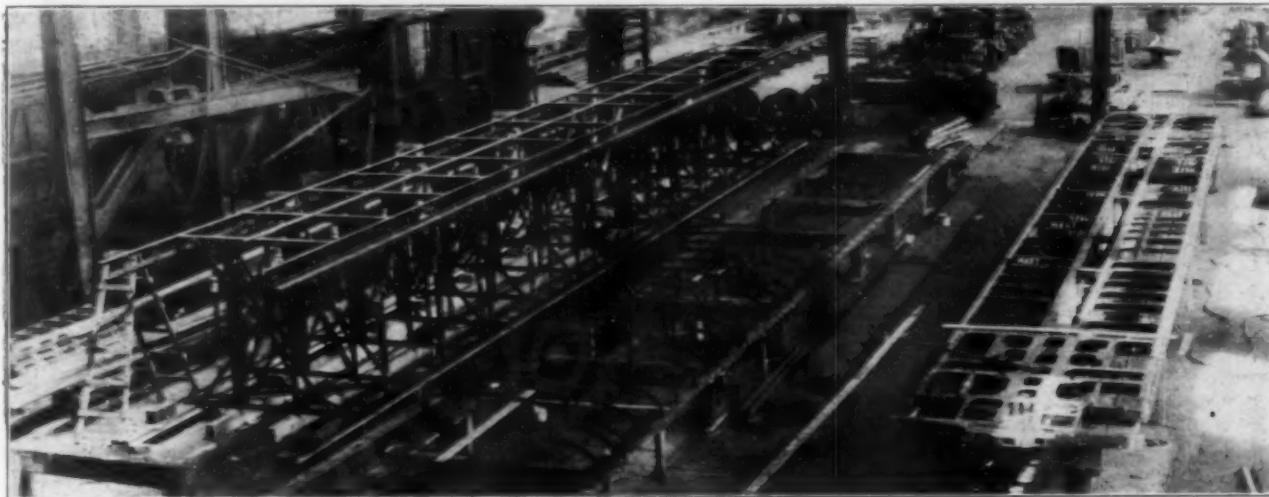
#### The Underframe

The construction of these cars is representative of the latest practice of the Canadian Pacific in its passenger

inside and outside walls of the car sides, is riveted to the top of the side sill. This makes an air-tight floor.

#### The Side and Roof Construction

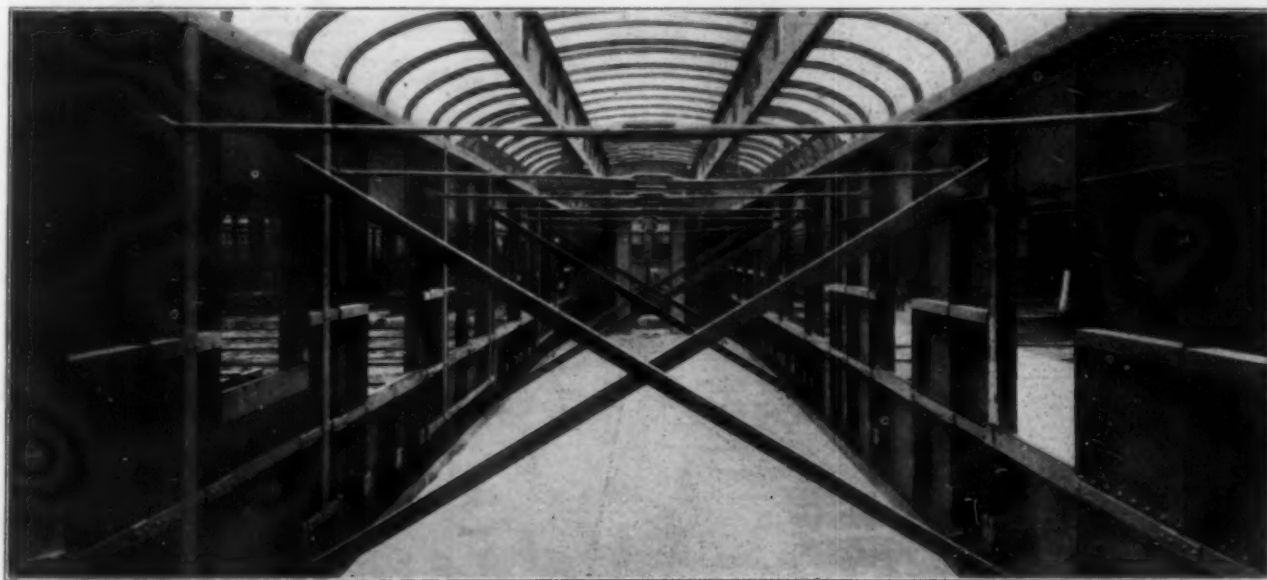
At the break of the deep section of the center sill at each end are single web transverse diaphragm cross members which extend down for the full depth of the sills at the center. The remainder of the cross members are of single diaphragm pressings, 5 in. deep.



The Body Frame Jig (Left), the Roof Jig (Center) and the Underframe (Right)

equipment design. The underframe is built up of 30½-in. deep center sills of the fish belly type, with Commonwealth steel platform and bolster castings built in at the ends. The sills consist of 5/16-in. plates with 6-in. by 4-in. by ⅝-in. top flange angles on the outside only, and 3-in. by 3-in. by ⅝-in. bottom flange angles on both the

In its recent designs, the Canadian Pacific has replaced the former channel type pressed steel side members of the body frame with posts of angle section. Experience has indicated that the rolled sections are more durable than the pressed sections and they also lend themselves readily to the application of the furring necessary for



The Completed Steel Work, Ready for the Wood Work

inside and outside. The sill top cover plate is 30 in. wide by 9/16-in. thick and is securely riveted into the steel platform castings at the ends. The side sills are 5-in., 11.6-lb. Z-bars, with the bottom flange extending outward to which the bottom chord angle of the side frame is riveted. An angle of ⅝-in. plate, 3⅝ in. by 4 in., which separates the floor from the space between the

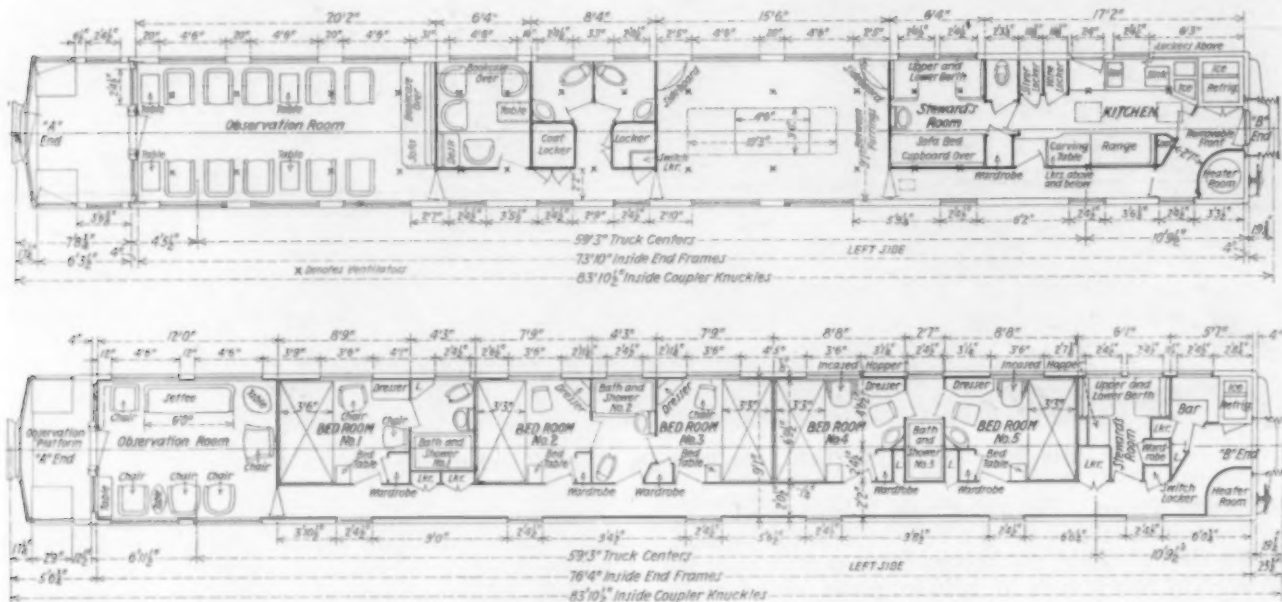
the application of the wood interior finish. One of the drawings gives a clear picture of the general features of the side frame. The important body members are the 3½-in. by 3-in. by ¼-in. angle posts; the 3/16-in. girder plate, which is riveted to the outside of the posts below the windows and covered at the top with special bar section belt rail; a ⅝-in. letter plate above the win-

dows, and a  $1\frac{1}{2}$ -in. by  $\frac{1}{2}$ -in. special rectangular bar section extending over the entire length of the car at the top of the windows just below the letter plate.

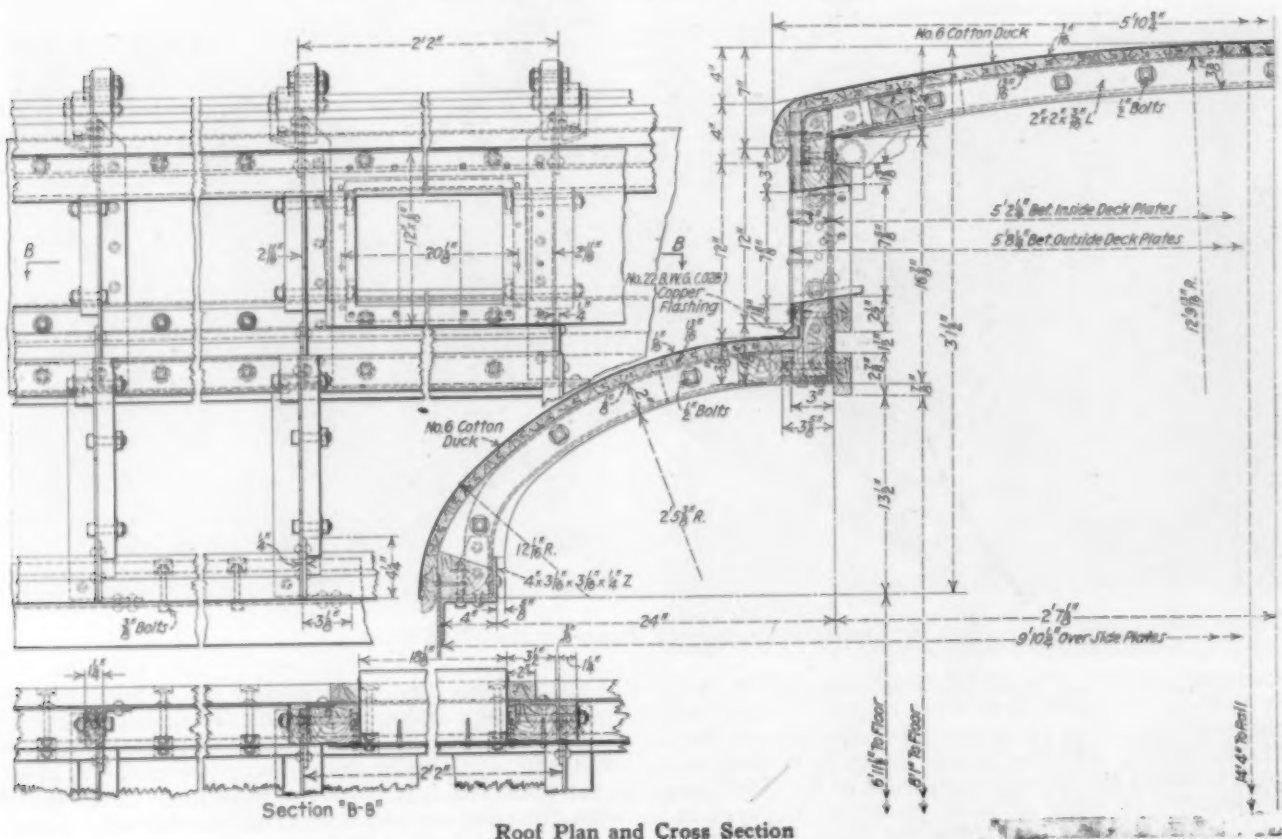
The side frame is completed at the bottom with a 3-in. by  $2\frac{1}{2}$ -in. by  $\frac{1}{4}$ -in. angle, forming the attachment to the underframe and at the top with a 4-in., 8.2-lb. Z-bar plate with the web horizontal and the inside flange up. This forms the foundation for the roof structure which consists essentially of angle carlines, each built up of five pieces. These pieces, with the flanges reversed where they are jointed, are secured together with gussets. The vertical portions of the carlines

on each side are riveted to a continuous  $\frac{1}{8}$ -in. inside deck plate, through which openings are cut for the ventilators, which ties the entire roof structure together in girder form. The roof is covered with 13/16-in. tongued and grooved fir boards running longitudinally, and surfaced with No. 6 cotton duck. The details of the structure are clearly shown in one of the drawings. It will be seen that the  $\frac{1}{8}$ -in. outside steel plate on the side of the upper deck forms no part of the steel structure, but is applied to the furring and wood fillers with screws.

The interiors of all Canadian Pacific steel passenger cars are finished in wood, a practice which is to some



Floor Plans of the Mt. Stephen (above) and of the Strathcona (below)



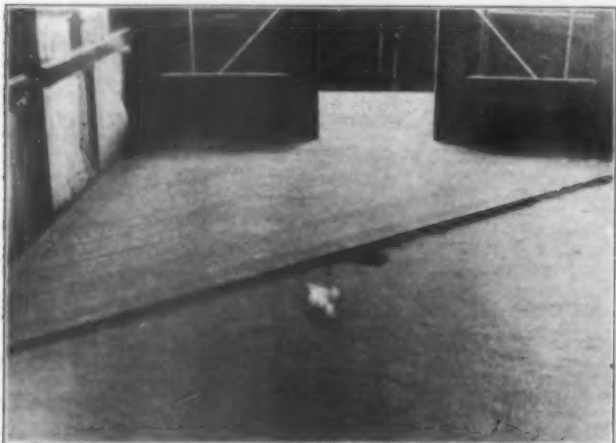
Roof Plan and Cross Section





ing consists of 13/16-in. tongue and grooved B. C. fir laid diagonally. Before the top floor is laid, the sub-floor is flushed with a layer of referite. The top floor consists of 1-in. tongue and grooved clear edge grain B. C. fir, also laid diagonally, but in the opposite direction to the sub-floor.

The cars are beautifully finished in brown walnut. In the observation room and office of the Mt. Stephen, the finish is panelled. In the dining room of this car the finish is flat, relieved with Marquetry inlaid lines and small corner ornaments. The woodwork in the observation room of the Strathcona is panelled. The grain of



The Top Floor

the wood furnished a harmonious background for the rich draw curtains hung at the windows of the observation and dining rooms.

#### Construction Methods

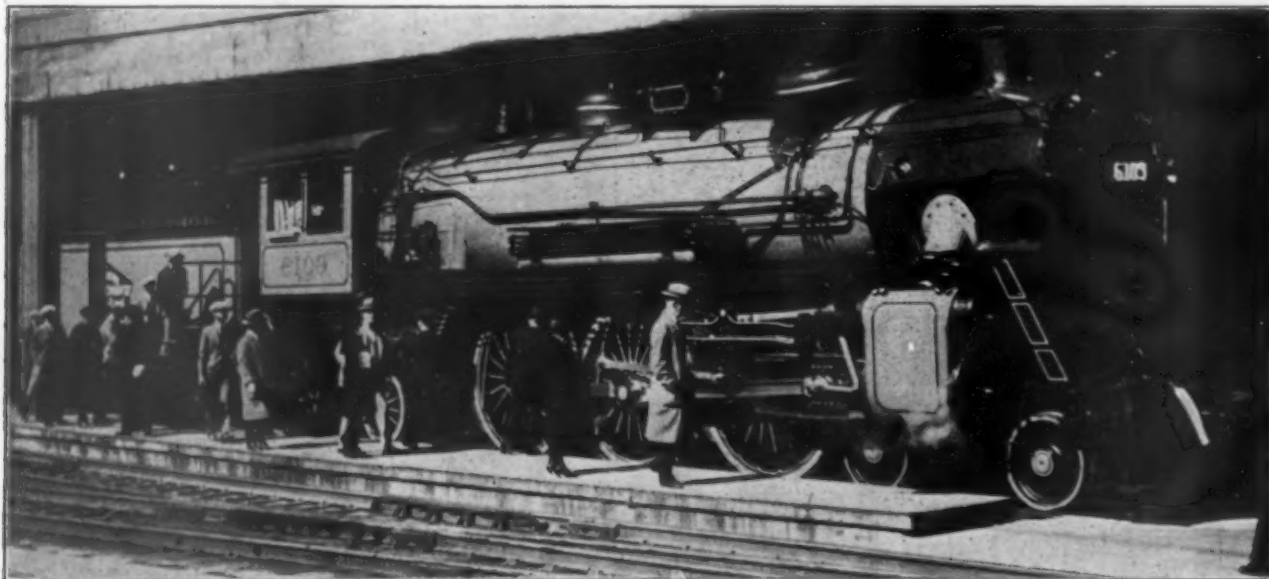
Several of the illustrations show various stages in the process of building steel passenger cars at the Angus

shops. The steel frames are assembled on jigs which are shown in one of the photographs. The side posts and side plates are shown in place on the side frame jigs, and several carlines are in place on the roof jig. When the side frames have been completed, they are moved by crane to the underframe and riveted in place, being held in alinement by temporary cross bracing.

After the carlines have been riveted up and properly placed on the roof jig, the inside deck sheets are applied and riveted to them. The completed roof frame is then lifted by crane and applied to the top of the body frame. The car is then in the condition shown in one of the illustrations and is moved out the steel shop ready for the woodwork and finish.

One of the interesting methods at the Angus shops is the way in which radiators and other interior pipes are installed. All inside piping is built to templates in the pipe shop. It is then completely installed in the car before the bulkheads and other interior finish is applied. Another point of interest is the location of the main wiring conduits. These are installed in the corners formed by the roof and the upper deck sides where they can be covered with corner molding. The removal of the molding permits access to the conduit without disturbing any other part of the finish. Leads from the main conduit are all encased in flexible conduit.

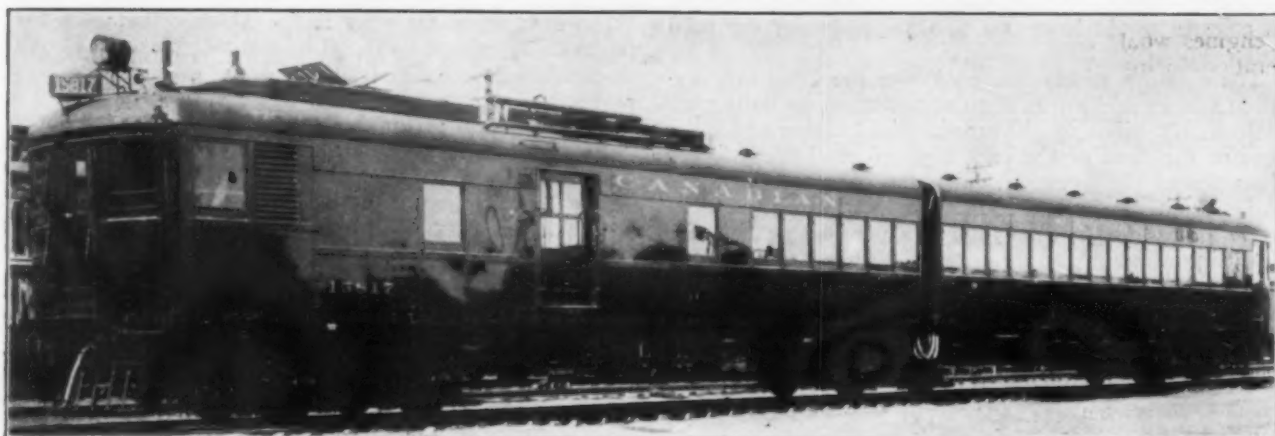
In the construction of the Mt. Stephen something of a record was established at the Angus shops. The first order in connection with the building of this car was placed with the shops on October 23, and the first of the material orders was also placed at that time. The car was laid down on the erecting floor on October 30 and all material for cabinet work was on hand November 1. The Commonwealth castings for the underframe and the trucks were received on November 9 and the steel work completed, ready for the woodwork on November 17. The car was finished and delivered by the shop ready for service on December 23, just two months from the placing of the order, a record in which all companies from which material was purchased fully co-operated.



Underwood & Underwood

#### Locomotive of the C. M. & St. P.'s "Pioneer Limited," Painted Orange to Match the Cars

The orange is on the boiler jacket, cab and tender. The following parts are maroon: Tender frame, front end, stack, sand dome, steam dome, cab roof, cylinder heads, front end ladders, etc., piping and hand rails. Driving wheels are maroon with orange striping and tires are orange. The "Safety First" motto is lettered on the cylinder jackets. The Milwaukee monogram and a spread eagle appear on the front end. Cab fittings, bell and whistle are nickel-plated.



One of the Articulated Cars Built in 1925

## Diesel Cars Reduce Operating Costs on C. N. R.

*After a year's service the road is building five additional units of modified design*

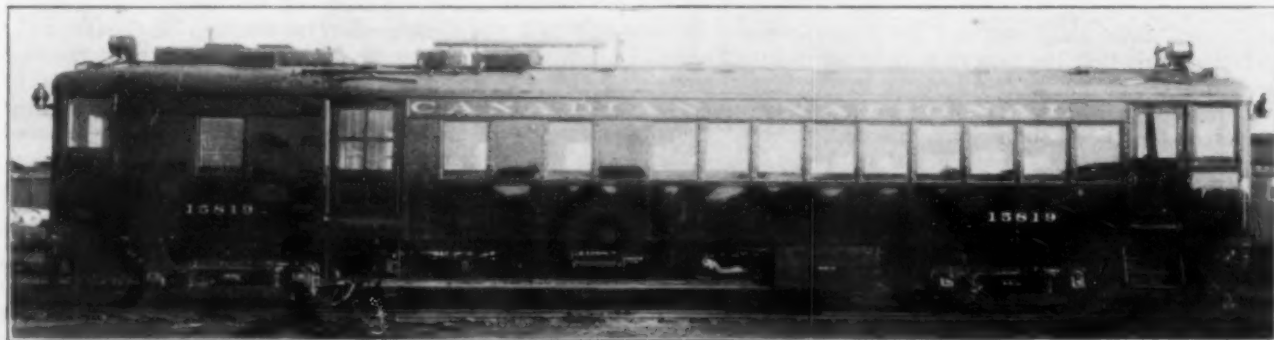
**F**ROM September, 1925, to May, 1926, the Canadian National placed in service an order of nine Diesel electric cars built at its Point St. Charles shops, Montreal, Que., and equipped with light weight Diesel engines built by William Beardmore & Co., Ltd., London, England, driving the cars through an electric transmission system. Seven of the cars were single units having an overall length of 60 ft. and seating 57 passengers. The other two were of the articulated type with an overall length of 102 ft. and each seating a total of 126 passengers.\* The single unit cars were equipped with four-cylinder Diesel engines developing 185 hp. at 700 r.p.m., direct connected to British Thomson-Houston generators which furnish power to two G.E. 240-A railway motors both mounted on the front truck and connected through helical gears. The articulated cars are equipped with eight-cylinder Beardmore engines developing 340 hp. at 650 r.p.m. which are coupled to a Westinghouse 200-kw., 600 volt, d.c. generator which furnishes the power for four Westinghouse 548-C-8 railway motors connected permanently in parallel and

mounted two on each of the front and rear trucks and driving through helical gearing. The cars are also equipped with 300-volt storage batteries which are used for starting the engines by motoring the generators and which also furnish current for the generator field excitation and for driving the air compressors. Circuits at 50 volts are also taken off for the control and for lighting.

### Cars Serve Light Traffic

The Canadian National has numerous lines where traffic is relatively light and this is one of the important considerations which led the road to consider the possibilities of the self-propelled type of passenger equipment which offers the advantages of a reduction in the size of train crews, relatively low maintenance expense and greater availability than can regularly be obtained from steam locomotives. The Diesel engine as the source of motive power for this type of equipment was chosen in preference to gasoline engines because of the lower fuel cost possible. The cost of gasoline to the railroad is 22 cents an imperial gallon, whereas the cost of fuel oil for the Diesel engine is 12 cents. On this basis the use of gasoline engines of equal power in place of the present

\* For a complete description of these cars see the *Railway Age* for October 17, 1925, page 695.

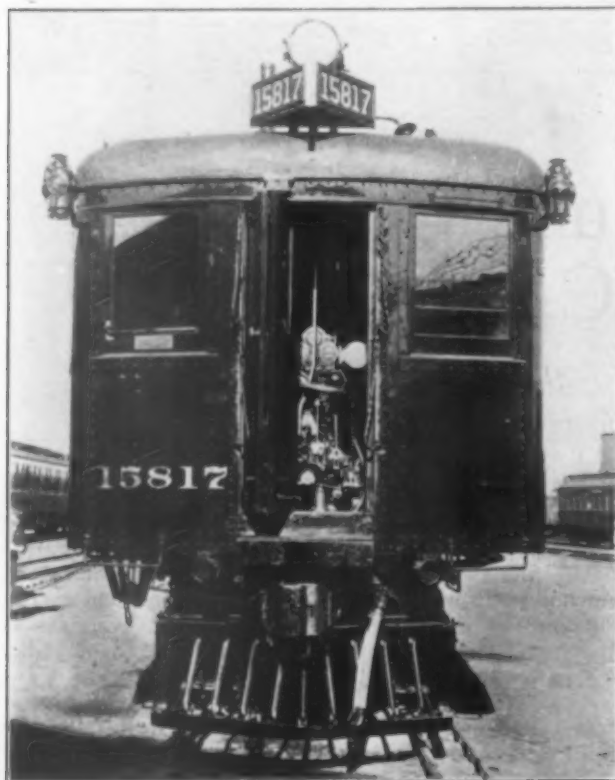


One of the Four-Cylinder Single-Unit Cars Built in 1925



oil engines would have cost \$78,000 more for the total operation during 1926.

The cars are widely scattered over the Canadian National system and are in regular operation on daily runs of from 176 miles to 350 miles. The location and mileages of the runs of the cars is given in Table I. The character of the lines on which the cars are operating varies from flat prairie country where grades are relatively low to lines with as high as 2 per cent grades with a maximum length of three miles. They are operating on both branch and main lines, handling relatively light traffic and making frequent stops. All of the cars at times carry trailers, some of them at all times.



Front End of One of the Articulated Cars Showing the End of the Oil Engine

The length of time during which the cars have been in service varies considerably. The first car was placed in service in September, 1925, and the last one in May, 1926. The mileages, during 1926, vary from a maximum of over 71,000 to a minimum of about 29,000 and the nine cars made an aggregate mileage of approximately 452,000, which was accompanied by an aggregate of over 238,000 trailer miles, during the year.

#### Operating Results

During this time the cars have been subjected to more or less development, as is inevitable in the first application of a new combination, but no important inherent defects in the Diesel engine have been encountered. Such difficulties as were met with in fitting the cars into the regular routine of operation were more due to the complete unfamiliarity of the entire organization with this type of equipment and its requirements than to any defects in the equipment itself, or any requirements or limitations to which the personnel of the organization could not adjust themselves with experience.

The service which the cars have rendered and the results of their operation are set forth in Tables II and

III, which cover the year 1926. During that year the nine cars aggregated 451,991 motor-car miles and moved an additional 238,276 trailer miles. This service was performed at an average rate of slightly more than 3.5 miles per gallon of fuel and of 64.4 miles per gallon of lubricating oil. The two articulated cars averaged a fraction over two miles per gallon of fuel, which is considerably lower than the figures for the single unit cars. These latter vary considerably among themselves, depending on the relative amount of trailer mileage, character of the line, etc. The lubricating oil performance varies widely with little apparent consistency.

The operating efficiency, shown in Table II, is obtained by subtracting from the total schedule days the number of days out of service on account of transportation conditions, and dividing the remainder into the number of days actually in service, the result being stated in per cent. For the various cars this varies from 67 to 97 per cent, averaging 81 per cent for all of the cars. These figures represent the average for the first full year's operation with equipment of this kind, during the early months of which several of the cars were first placed in service. They do not, therefore, furnish adequate data on which to compare their availability with steam motive power. Neither do the failures afford the ultimate measure of their reliability, as many of these failures are not chargeable to the equipment, but to a lack of knowledge of how to operate and care for it.

In Table III the cost of maintaining and operating the cars is summarized in considerable detail. The revenues per car, which are also included, make possible a fair evaluation of the economic value of this type of equipment. In the operating expense items, attention should be called to the fact that the amount charged to repairs does not include certain capital charges and development expenditures, but are confined to the expenditures actually incurred in regular repairs.

During 1926 the nine cars produced a total revenue of \$337,041.45. The total direct cost of operating them, including repairs and an allowance for mechanical department supervision, was \$127,421.73. This leaves a net operating revenue of \$209,619.72. Per motor-car mile, the revenue averaged 73.7 cents; the cost of operation, 28.19 cents; the net operating revenue, 45.5 cents.

#### Comparison with Steam Trains

As a comparison between the cost of operating these cars and of operating steam trains in similar service, the two cars operating between Edmonton, Alta., and Saskatoon were selected. In this service these two cars aggregate 700 miles per day. The comparable selected accounts for the representative steam trains superseded by the oil-electric cars cost \$1.01 per train-mile, while the cost for oil-electric cars is 23 cents per train-mile, making a difference of 78 cents per train-mile. The two oil-electric cars replaced four steam locomotives, and the interest and depreciation on the locomotives alone is practically the same as that on the two oil-electric cars.

During 1926 these two cars produced a total revenue of \$131,447, and a net operating revenue of \$98,838. In the service mentioned, they made 120,087 miles, which represents an aggregate saving of \$93,677 as compared with the steam trains. This saving accounts for a very large part of the net revenue from the trains operated.

#### Problems as Maintenance and Education

As the figures will show, no attempt has been made to disguise the fact that difficulties have had to be overcome in fitting the Diesel electric cars into service. The mechanical troubles have been due more to the auxiliary equipment, however, than to the Diesel engine itself and

these difficulties, in turn, were due more to lack of experience in operating and caring for the equipment than to any serious defects in the auxiliaries. One of the

Table I—Runs on Which the Oil-Electric Cars Are Operating

| Car No. | Run   | Mileage |
|---------|---|---------|
| 15817*  | Guelph, Ont., to Palmerston and return.....                 | 324     |
| 15818*  | Palmerston, Ont., to Kincardine and return.....             | 266     |
| 15819   | Quebec, Que., to Richmond and return.....                   | 206     |
| 15820   | Edmonton, Alta., to Saskatoon, Sask., one way daily.....    | 350     |
| 15821   | Oxford Junction, N. S., Truro, Sackville, N. B., daily..... | 176     |
| 15822   | Edmonton, Alta., to Saskatoon, Sask., one way daily.....    | 350     |
| 15823   | Tignish, P. E. I., to Charlottetown and return.....         | 232     |
| 15824   | Montreal, Que., to Waterloo and return.....                 | 142     |
| 15825   | Ottawa, Ont., to Pembroke and return.....                   | 180     |

\* Articulated units.

greatest sources of difficulty during the first winter was the radiators in the engine cooling system; last winter radiators caused very little trouble. No appreciable cylinder bushing wear has developed in the engines and the bearings have given no trouble. At the outset, the

filtering the oil in the engine lubrication system owing to the tendency for carbon from the combustion chamber to accumulate in the oil. A filter in the fuel oil line has also been found desirable in order to reduce the wear on the fuel injection pumps, which operate at pressures of 8,000 lb. to 10,000 lb. per sq. in.

At the outset the runs on which these cars were placed were bid in by the younger men. As the men became better acquainted with the equipment, however, it began to appear more desirable and the older men are now bidding for Diesel car runs.

A man has been selected at each terminal where one or more of these cars is cared for, and is trained specially to look after them. These men in some cases are selected from the electrical maintainers and in others from the machinists, each man, however, being trained to care for both electrical and mechanical details. A motor car supervisor, who has general supervision of the Diesel cars in his territory, is assigned to each gen-



The New 73-ft. Single-Unit Car Just Completed by the Canadian National

engines were built with a liberal allowance for piston clearance. This was done as a factor of safety in developing this type of engine for a service in which it had never been used before. Experience has indicated, however, that less clearance is needed. Experience has demonstrated the desirability of including a means of

eral manager's territory, making three for the system. The road foremen of engines where these cars are operating have now become familiar with them and exercise supervision over their operation and the training of the operators.

The big problem of adapting the cars to the organiza-

Table II.—Summary of the Daily Performance of Oil-Electric Cars for the Year 1926

|   | Articulated cars |        | 60-ft. cars |        |         |         |         |         |        | All cars, totals |
|---|------------------|--------|-------------|--------|---------|---------|---------|---------|--------|------------------|
|   | 15817            | 15818  | 15819       | 15820  | 15821   | 15822   | 15823   | 15824   | 15825  |                  |
| 1 Motor car miles.....                                  | 49,957           | 56,369 | 46,872      | 70,114 | 36,052  | 71,119  | 41,488  | 29,585  | 50,435 | 451,991          |
| 2 Trailer miles.....                                    | 38,229           | 32,074 | 4,269       | 61,396 | 806     | 49,361  | 14,902  | 25,933  | 1,706  | 238,676          |
| 3 Days out of service on account of equipment.....      | 101              | 67     | 69          | 38     | 69      | 29      | 14      | 52      | 8      | 447              |
| 4 Days out of service on account of transportation..... | 46               | 34     | 26          | 45     | 32      | 68      | 11      | 16      | 13     | 291              |
| 5 Total scheduled days.....                             | 313              | 313    | 313         | 313    | 313     | 313     | 209     | 275     | 305    | 2,667            |
| 6 Complete failures.....                                | 7                | 7      | 5           | 4      | 6       | 4       | 1       | 4       | 5      | 43               |
| 7 Delays not included in item No. 6.....                | 10               | 18     | 15          | 14     | 15      | 8       | 5       | 18      | 6      | 109              |
| 8 Minutes delayed.....                                  | 269              | 591    | 480         | 709    | 541     | 404     | 165     | 332     | 138    | 3,629            |
| 9 Gals. fuel oil used.....                              | 22,833           | 25,373 | 11,028      | 16,123 | 9,191   | 15,349  | 9,528   | 8,226   | 9,651  | 127,307          |
| 10 1,000 ton-miles.....                                 | 6,262            | 6,666  | 2,526.5     | 5,841  | 1,878.5 | 5,277.5 | 2,517.5 | 2,252.5 | 2,650  | 35,871.5         |
| 11 Ave. miles per gal. fuel oil.....                    | 2.19             | 2.2    | 4.5         | 4.34   | 3.93    | 4.63    | 4.24    | 3.62    | 5.23   | 3.548            |
| 12 Gals. fuel per 1,000 ton-miles.....                  | 3.65             | 3.8    | 4.36        | 2.76   | 4.89    | 2.9     | 3.78    | 3.651   | 3.64   | 3.62             |
| 13 Gals. lubricating oil used.....                      | 1,896            | 1,211  | 526         | 988    | 484     | 803     | 367     | 405     | 313    | 6,993            |
| 14 Ave. miles per gal. lub. oil.....                    | 26.3             | 46.5   | 88.7        | 71.5   | 74.5    | 88.5    | 113     | 73      | 160.9  | 64.4             |
| 15 Gals. lub. oil per 1,000 ton-miles.....              | .302             | .181   | .208        | .169   | .257    | .152    | .145    | .179    | .1181  | .1949            |
| 16 Operating efficiency.....                            | 62%              | 76%    | 76%         | 86%    | 75%     | 88%     | 93%     | 80%     | 97%    | 81%              |

Note: On cars 15817-18-19-20-22 a live load of 3,000 lb. added to car and trailer weights to obtain 1,000 ton miles.  
On cars 15821-23-24-25 a live load of 1,500 lb. added to car and trailer weights to obtain 1,000 ton miles.

tion has been one of education. This has been accomplished by illustrated talks, by the reading of papers at meetings and by a book of instructions on the operation and maintenance of the cars which was developed under the direction of the chief electrical engineer, under whose general supervision this equipment has been placed. The regular operators and certain other enginemen who occasionally may be called upon to operate these cars receive examinations, the questions for which are based on the instruction book. By these various means the lack of experience has gradually been overcome.

#### More Cars Being Built

The experience with these cars and their ability to convert an operating deficit or extremely small margin of net return into an appreciable net operating revenue on light traffic passenger runs has led the Canadian National to build five more oil-electric cars. These cars differ in several respects from either of the types now in service. The engines, like those in the former cars, are built by William Beardmore & Co., Ltd., London, England. While, in detail, of essentially the same construction as those in the former cars, they are of the six-cylinder type, whereas the engines in the present cars have four cylinders and eight cylinders, respectively. Like the former engines, the cylinders have 8¼-in. bore and 12-in. stroke. They develop 300 hp. at 750 r.p.m., and, with the flywheel, weigh approximately 6,900 lb. One of the features of special interest in the new engines is a filter in the lubricating oil system through which the oil is forced at 40 lb. pressure from the pump at the gear case end of the engine before passing through the working bearings, all of which are pressure lubricated. The sump acts as a lubricating oil storage in which the oil is air cooled. Fuel oil is carried in a 150-gal. tank in the engine room and flows by gravity to an Auto-Klean filter. From here it is pumped to the distributing plunger pumps, one for each pair of cylinders. An additional 150-gal. fuel tank is suspended under the car.

The electrical equipment of these cars is furnished by the Canadian Westinghouse Company. It includes a 198-kw., d.c. generator. This is a compound wound machine and is mounted on a common bedplate with, and rigidly connected to, the engine. On the same shaft with the generator is mounted a 5.6-kw., 64-volt auxiliary generator. Two 569 C.4, 600-volt, 215-hp. railway motors are mounted on the front truck and connected through helical gears at a 20:59 ratio. The controller located on the front end connects the motors to the generator and governs direction, engine starting, with manual throttle control of the engine speed. The batteries in the former cars carry 300 volts. The new cars are equipped with 64-volt, M.V.A. 17 Ironclad Exide batteries carried under the rear half of the car in a steel battery box. This battery furnishes starting current for driving the generator as a motor and is charged from the auxiliary generator.

The car bodies are of steel construction throughout. The frames were built by the Canadian Car & Foundry Company, Ltd., and the bodies finished by the railroad at its Point St. Charles shops, Montreal. The cars are 73 ft. 9 in. long over the end sills and have an estimated weight on the rail, with all equipment installed, of 133,000 lb. The engine room occupies 16 ft. 6 in. of the floor space at the front end of the car. In some of the cars the baggage compartment is 27 ft. 2 in. long, while in others 5 ft. 7 in. of this space is utilized as a smoking compartment. The main passenger compartment at the rear is 27 ft. 2 in. long. The seats are arranged to accommodate three persons on one side and two on the other and have a total seating capacity of 37.

Table III.—Statement of Operation of the Oil-Electric Cars for the Year 1926, with Capital and Development Charges Omitted from Repairs

| Revenues                                   | Articulated cars |             |             |             |             |             |             |             |              |             | Totals<br>all cars |
|--|------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|-------------|--------------------|
|  | 1927             | 1926        | 1925        | 1924        | 1923        | 1922        | 1921        | 1920        | 1919         | 1918        |                    |
| 1 Passenger                                | \$41,376.43      | \$33,744.75 | \$75,121.18 | \$19,892.73 | \$15,345.60 | \$16,229.69 | \$19,186.79 | \$80,193.13 | \$155,314.31 | \$15,247.40 | \$15,247.40        |
| 2 Mail                                     | 7,519.39         | 6,197.57    | 13,716.96   | 83.65       | 242.76      | 476.76      | 1,380.97    | 1,530.53    | 1,795.97     | 15,247.40   | 15,247.40          |
| 3 Milk                                     | .....            | 415.00      | 415.00      | 323.96      | .....       | .....       | .....       | .....       | .....        | .....       | .....              |
| 4 Express                                  | 12,075.20        | 8,665.74    | 20,740.94   | 1,597.73    | .....       | .....       | .....       | .....       | .....        | .....       | .....              |
| 5 Total Revenues                           | 60,971.02        | 49,023.06   | 109,994.08  | 21,898.07   | \$74,959.94 | \$15,888.36 | \$22,187.29 | \$12,495.65 | \$33,236.59  | 337,041.45  | 337,041.45         |
| Expenses                                   |                  |             |             |             |             |             |             |             |              |             |                    |
| 6 Maintenance of equipment                 | \$678.55         | \$867.65    | \$1,546.20  | \$599.52    | .....       | \$26.39     | .....       | .....       | .....        | \$762.10    | \$3,368.26         |
| 7 Repairs (Accts. 317-320)                 | 3,600.00         | 3,600.00    | 7,200.00    | 5,429.96    | .....       | 3,000.00    | .....       | .....       | .....        | 3,000.00    | 29,254.96          |
| 8 Wages of enginemen (Acct. 393)           | .....            | .....       | .....       | .....       | .....       | .....       | .....       | .....       | .....        | .....       | .....              |
| 9 Wages of trainmen (Acct. 401)            | .....            | .....       | .....       | .....       | .....       | .....       | .....       | .....       | .....        | .....       | .....              |
| 10 Fuel (Acct.)                            | 3,257.99         | \$3,696.18  | \$6,954.17  | \$3,230.70  | \$3,782.02  | \$4,282.06  | \$2,928.35  | \$1,956.14  | \$1,956.14   | \$3,532.51  | \$22,734.50        |
| 11 Lubricants (Acct. 402)                  | 2,395.62         | 4,290.44    | 7,976.71    | 2,873.91    | 3,973.87    | 4,132.69    | 1,382.28    | 2,363.63    | 2,363.63     | 1,050.22    | \$29,688.67        |
| 12 Other supplies (Acct. 402)              | 1,905.26         | 1,427.70    | 3,332.96    | 631.41      | 1,502.60    | 1,984.55    | 412.15      | 1,450.15    | 1,450.15     | 1,535.82    | 30,369.61          |
| 13 Total                                   | \$17,293.14      | \$18,294.37 | \$35,587.31 | \$12,398.86 | \$16,283.55 | \$17,288.10 | \$10,757.42 | \$10,858.10 | \$8,534.40   | \$2,031.94  | \$127,421.73       |
| 14 Net operating revenue                   | \$43,677.88      | \$30,728.69 | \$74,406.77 | \$9,499.21  | \$58,676.39 | \$40,161.45 | \$31,188.93 | \$47,302.26 | \$13,445.81  | \$7,941.06  | \$209,619.72       |
| STATISTICS                                 |                  |             |             |             |             |             |             |             |              |             |                    |
| 15 Motor car miles                         | 49,957           | 56,369      | 106,326     | 46,872      | 70,114      | 71,119      | 36,052      | 41,488      | 29,585       | 50,435      | 451,991            |
| 16 Trailer miles                           | 38,229           | 32,074      | 70,303      | 4,269       | 61,396      | 49,361      | 806         | 14,902      | 25,933       | 1,706       | 168,373            |
| 17 1,000 ton-miles                         | 6,262            | 6,666       | 12,928      | 2,526.5     | 5,841       | 5,277.5     | 1,878.5     | 2,517.5     | 2,252.5      | 2,650       | 23,876.5           |
| 18 Motor car days serviceable in operation | 166              | 166         | 378         | 218         | 230         | 216         | 212         | 184         | 207          | 184         | 1,929              |
| 19 Ave. daily miles in operation           | 301              | 266         | 281         | 218         | 305         | 329         | 173         | 225         | 143          | 178         | 234                |
| 20 Number of men in crew                   | .....            | .....       | .....       | .....       | .....       | .....       | .....       | .....       | .....        | .....       | .....              |
| 21 Passengers carried                      | 43,041           | 40,534      | 83,575      | 34,775      | 45,216      | 30,023      | 27,215      | 27,637      | 23,810       | 2           | 288,144            |
| 22 Revenue per motor car mile, cents       | 132              | 101.4       | 107         | 107         | 107         | 107         | 107         | 107         | 107          | 107         | 107                |
| 23 Revenue per motor car mile, cents       | 132              | 101.4       | 107         | 107         | 107         | 107         | 107         | 107         | 107          | 107         | 107                |
| 24 Cost per 1,000 ton-mile, cents          | 12               | 12          | 12          | 12          | 12          | 12          | 12          | 12          | 12           | 12          | 12                 |
| 25 Repairs per motor car mile, cents       | 7.2              | 6.39        | 6.27        | 6.27        | 6.27        | 6.27        | 6.27        | 6.27        | 6.27         | 6.27        | 6.27               |
| 26 Fuel per motor car mile, cents          | 3.85             | 4.42        | 4.59        | 4.48        | 4.82        | 4.22        | 4.82        | 4.82        | 4.82         | 4.82        | 4.82               |
| 27 Lubricants per motor car mile, cents    | .....            | .....       | .....       | .....       | .....       | .....       | .....       | .....       | .....        | .....       | .....              |
| 28 Cost per motor car mile, cents          | 34.62            | 32.3        | 33.5        | 26.45       | 23.22       | 23.0        | 29.8        | 26.17       | 28.84        | 26.6        | 28.19              |





**NEW  
AND IMPROVED  
DEVICES FOR  
LOCOMOTIVES  
AND CARS**

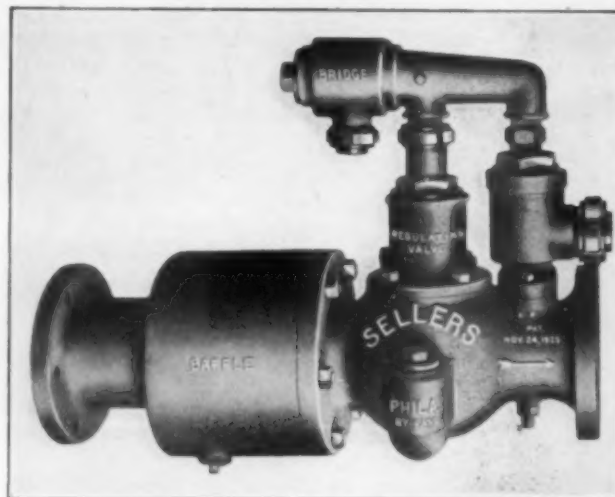
## Sellers Exhaust Feedwater Heater Injector

THE exhaust feedwater system designed by William Sellers & Company, Inc., 1600 Hamilton street, Philadelphia, Pa., consists of an injector with a set of low-pressure tubes with an exhaust steam nozzle of large diameter, delivering under pressure to a set of forcing tubes operated by steam from the boiler. The energy or heat contained in exhaust steam is a large proportion to that contained in steam at 200 or 250 lb. pressure, and it is this latent heat which is applied usefully to heat and forces a strong jet of water into the second set of nozzles. By this method, a large amount of the exhaust steam may be used, while all the heat taken from the boiler by the live steam tubes is returned to the boiler without subtraction from the available heating capacity of the exhaust.

Between the two sets of tubes is placed a check valve; steam or water from the forcing set of tubes cannot pass back into the exhaust delivery chamber, water supply,

valve handle; it is a simple mechanical operating device similar to that used on the non-lifting injector.

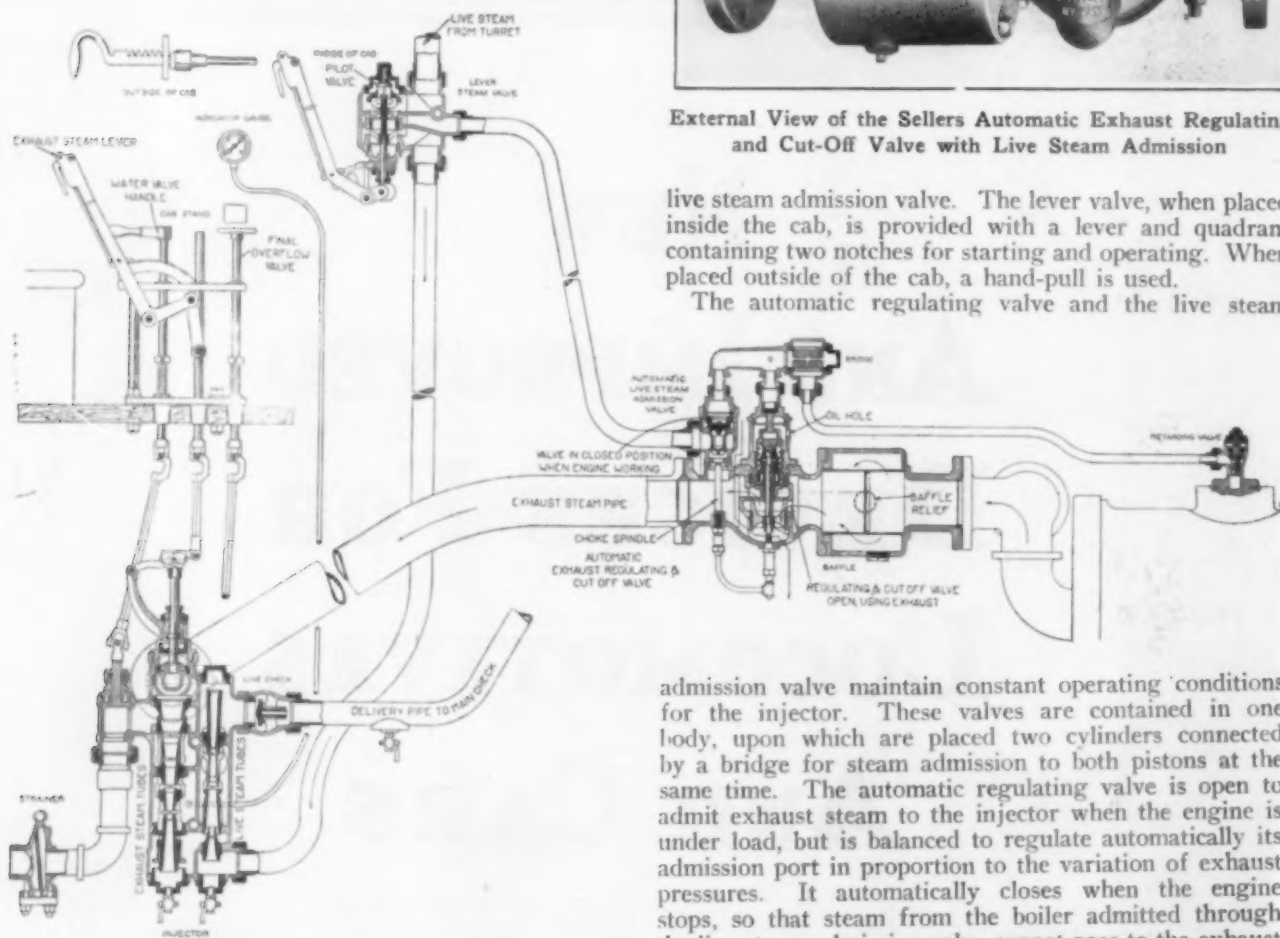
The lever starting valve is similar in design to the Sellers balanced lever starting valve, style V-C. A sleeve attached to the lifting stem closes the steam port to the forcing set of tubes until steam has been admitted to the



External View of the Sellers Automatic Exhaust Regulating and Cut-Off Valve with Live Steam Admission

live steam admission valve. The lever valve, when placed inside the cab, is provided with a lever and quadrant containing two notches for starting and operating. When placed outside of the cab, a hand-pull is used.

The automatic regulating valve and the live steam



The General Arrangement on the Locomotive of the Units and Pipes of the Sellers Exhaust Feed Water Heater Injector

or exhaust pipe. An indicator or vacuum gage is connected to the overflow chamber of the exhaust nozzles. When the correct proportions of water and steam are admitted, a partial vacuum is shown on the gage indicating that the injector is operating properly. The operating stand is directly in front of the engineman's seat and comprises an exhaust steam lever, lazy cock and overflow

admission valve maintain constant operating conditions for the injector. These valves are contained in one body, upon which are placed two cylinders connected by a bridge for steam admission to both pistons at the same time. The automatic regulating valve is open to admit exhaust steam to the injector when the engine is under load, but is balanced to regulate automatically its admission port in proportion to the variation of exhaust pressures. It automatically closes when the engine stops, so that steam from the boiler admitted through the live steam admission valve cannot pass to the exhaust ports of the cylinders.

These valves operate when the locomotive throttle is opened to admit steam to the steam chest; steam flows into the bridge and forces both pistons down, opening the exhaust regulating valve and closing the live steam admission valve by pressure on differential areas. If the locomotive throttle is closed when the injector is feeding, the pressure within the bridge is relieved, the pistons above each valve move upward, close the exhaust valve and open the live steam admission valve, to give a continuous flow of live steam to the exhaust nozzles at ap-

proximately the same pressure as previously supplied from the cylinders.

It is obvious that if both the live steam and exhaust regulating valves act at the instant the throttle is open and in advance of any supply of exhaust steam from the cylinders, the injector would be without steam until the locomotive was in motion. It is, therefore, advantageous to delay the action of both of these valves until there is sufficient movement of the engine to get a full supply of exhaust steam. This is done by the retarding valve placed at the forward end of the supply pipe to the bridge. It is a simple device provided with a small opening for flow toward the bridge and a quick opening to the exhaust to permit the valves to return to normal condition.

By the use of these devices, the injector will feed the boiler continuously when the engine is standing, hauling

the lever of the cab stand to give the required discharge area of the exhaust steam nozzle. The indicator gage instantly tells the engineman if the lever is in the right position. Careful enginemen will draw back the lever to admit as much exhaust as possible to induce the greatest economy. For the same reason the amount of steam passing through the live steam admission valve should be increased by hand adjustment during the winter months, when the water is colder, for the pressure within the injector exhaust supply pipe should be approximately the same with live or exhaust steam.

The Sellers system is applicable to high pressure, 200-250 lb., freight and passenger locomotives. The tubes, nozzles and all wearing parts can be removed without disconnecting the injector or valve bodies from the locomotive.

Live steam from the boiler cannot be used by the enginemen for operating the exhaust heater tubes of the injector when exhaust from the cylinder is available.



The Sellers Exhaust Steam Injector

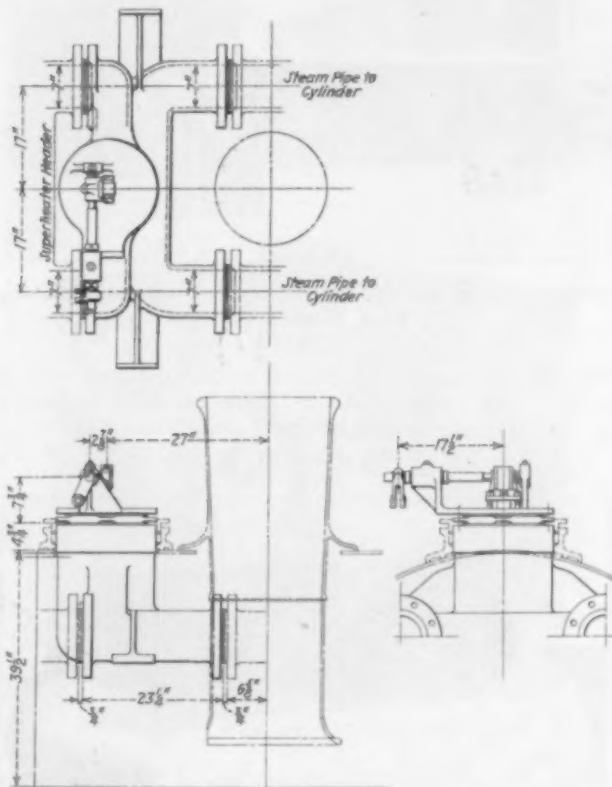
a train, or drifting; in fact, entirely independent of the position of the locomotive throttle, permitting the same functions as the usual non-lifting injector.

The method of operation is simple: If the locomotive is under load, the water valve is opened and the lever of the cab stand is drawn back until the indicator registers; the balanced lever starting valve is then opened and the overflow closed. When the engine is standing, the action is the same, except the preliminary opening of the lever valve one notch.

The amount of exhaust steam that can be used is fixed by the feed temperature limit of the forcing set of tubes; the colder the water in the tank, the greater the proportion of exhaust steam that may be used and the higher the relative efficiency of the apparatus; if the water supply is 45 deg. more exhaust steam can be used than when the water supply is 85 deg. Regulation of the exhaust steam supply is obtained by adjusting the position of

## Front End Throttle Valve Located to Reduce Weight

**W**HEN the Chambers front end throttle valve, manufactured by the Bradford Corporation, 25 West 43rd street, New York, was originally designed, it was placed ahead of the stack for the reason that in many modern locomotives, additional weight



General Arrangement of the Chambers Front End Throttle Valve Located Between the Superheater Header and the Stack

is desirable at the front of the boiler in order to keep the proper distribution of the load on the driving wheels and leading and trailing trucks. In some cases, the addi-



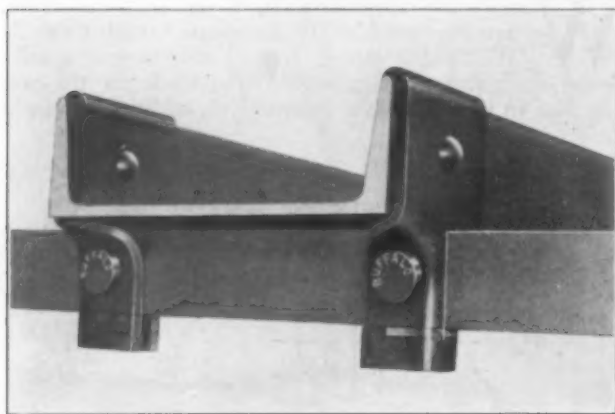
tional weight is a disadvantage and to meet this situation, the design illustrated has been prepared.

In this design, the front end throttle valve is located between the superheater header and the stack. With this arrangement, the weight of the throttle valve and parts is approximately 700 lb. less than with a front end valve located ahead of the stack. The internal parts used with this arrangement are the same as in the standard Chambers front end throttle valve. The connection from the operating shaft to the throttle valve has been modified; however, a sliding stem with a stuffing box being used instead of the rotating shaft with a metallic steam joint.

## Redesigned Brake Beam Support and Draft Key Lock

**T**HE Buffalo Brake Beam Company, New York, has within the past year made several changes to its auxiliary brake beam support and draft key lock for use on railway cars.

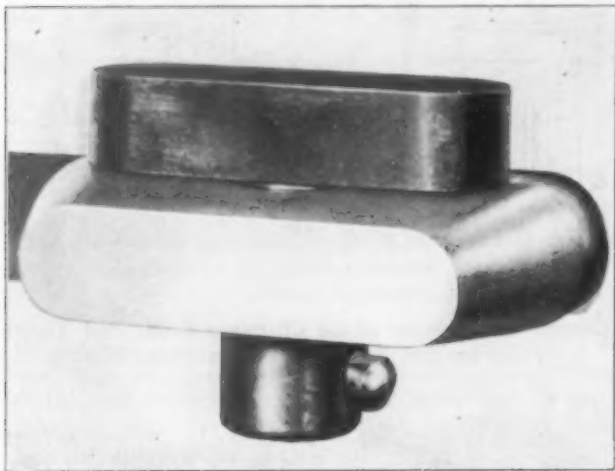
The auxiliary brake beam support, which is removable from either end, is now securely locked in place by two



Auxiliary Brake Beam Support Fastened with Self Locking Heat Treated Pins

self-locking heat-treated pins provided with case-hardened locking pawls. All the parts are interchangeable and can be made to suit various types of brake beams.

The principal change made to the standard A. R. A.

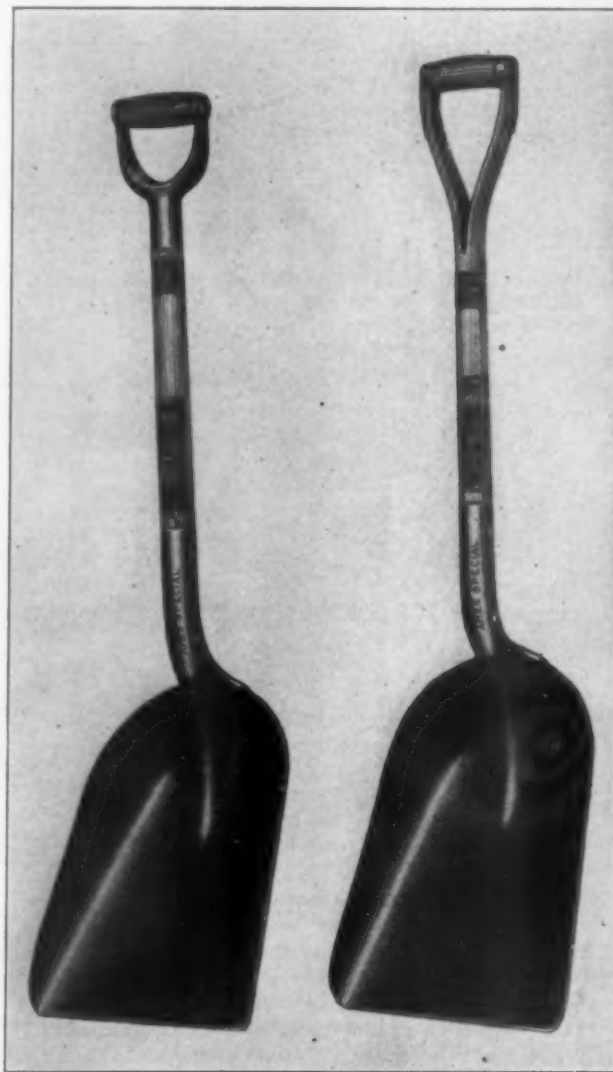


Self Locking Draft Key Pin

draft key lock has been the elimination of cotter pins by substituting a case-hardened self-locking pawl which is automatically locked, when applied, by a non-corrosive Monel metal coil spring and can only be removed when desired.

## Ames Locomotive Scoop

**T**HE Ames Shovel and Tool Company, 190 Ames Building, Boston, Mass., has placed on the market the Oliver Ames locomotive scoop. Starting with steel, the blade is fabricated of manganese alloy steel with high carbon content and a considerable amount



The Ames Locomotive Scoops Are Properly Balanced for Easy Handling

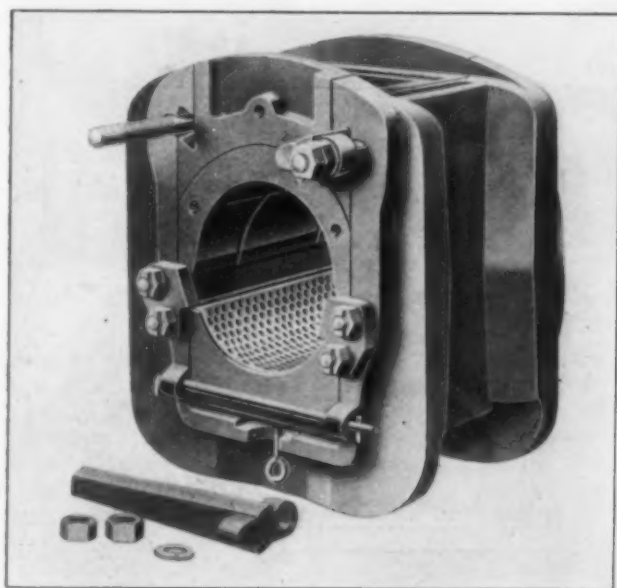
of manganese. When this steel is received, it is carefully inspected and put through a complete laboratory test before being released for use. In the laboratory test, the steel is put through various heating treatments to determine the proper temperature at which the shovel blades should be treated. Analysis is made of the shavings drilled from the steel to determine if the carbon, manganese, silicon, etc., contents are within the range of specifications. It is the aim to have the finished shovel

blade range not under 350 Brinell and not over 460 Brinell.

The handle is selected with care. Every handle used is inspected and only the best grade of Northern ash is used. A patented Oliver Ames bend gives the shovel the proper balance.

## Franklin Locomotive Driving Box

ORDINARILY, the removal of a driving box brass or the relining of a hub face involves the removal of the side rods and the dropping of the wheels. With the advent of the driving box now marketed by the Franklin Railway Supply Company, Inc., 17 East Forty-second street, New York, this work can be eliminated. The conventional driving box has the sides and the top cast integral. The bottom is open and contains a separate removable lubricating cellar. The bearing is forced into the box under heavy pressure. Since it is impracticable to provide a bearing surface on the removable cellar, such a box has a break in the bearing surface between the hub face and the driving wheel. This undesirable feature is remedied in the Franklin



The Crown Brass and Hub Liner of the Franklin Driving Box May Be Renewed Without Removing the Side Rods or Dropping the Wheels

driving box by coring out the bottom portion of the box to form a receptacle for the lubricator and leaving the outer or hub wall solid, which together with the bearing and retainer forms a complete circular bearing for the hub face of the wheel. This hub face is lined with bronze, thus improving the bearing surface.

In order to remove the bearing or to reline the hub face of the ordinary driving box, the wheels and axle must be dropped and removed. With the Franklin driving box the bearings are readily renewable and the entire driving box may be removed from the locomotive without disturbing the wheels. The two sides and bottom of the box are integral as opposed to the two sides and top of the customary design. The bearing of the box is somewhat similar in shape to the ordinary crown bearing

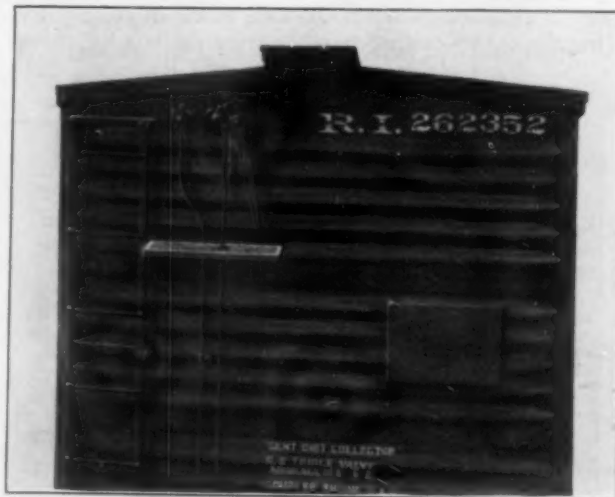
but has flat sides which fit between the vertical members of the box. The bearing is held in place by a bearing retainer which rests on the bearing and transmits thereto its proportion of the weight of the locomotive. This retainer and the bearings are clamped together and held immovable by two tapered wedges, the bearing surfaces of which are shaped to lock the different parts firmly together.

The bottom portion of the box is cored out to form a receptacle for the lubricator. The outer or hub wall of the cavity is solid, forming with the bearing and retainer a complete circular bearing for the hub face of the wheel. Abutments are provided on the inner end of the box to prevent an endwise movement of the bearing. On the top of the bearing is a ridge which fits into a corresponding groove out into the bearing retainer. This prevents any end movement of the bearing retainer. This interlocking makes the construction equivalent to an integral box, bearing and cellar.

The lubricator used is of the standard type except that the grease container has no end wall on the hub side. The end wall is unnecessary because its equivalent is cast integral with the box. This construction makes it possible to remove the grease container to inspect the grease cake without disturbing the other lubricator parts. The lubricator is provided with one indicator only, on the inside of the box so that the lubricator can be withdrawn entirely from the box for refilling or inspection. This is easily done by taking out the single retaining pin.

## Morton Kass Safety Brake Step

A SAFETY brake step for use on freight cars has been designed by the Morton Manufacturing Company, 5105 West Lake street, Chicago, to eliminate the danger of brakemen slipping while applying hand brakes. The step can be furnished with or

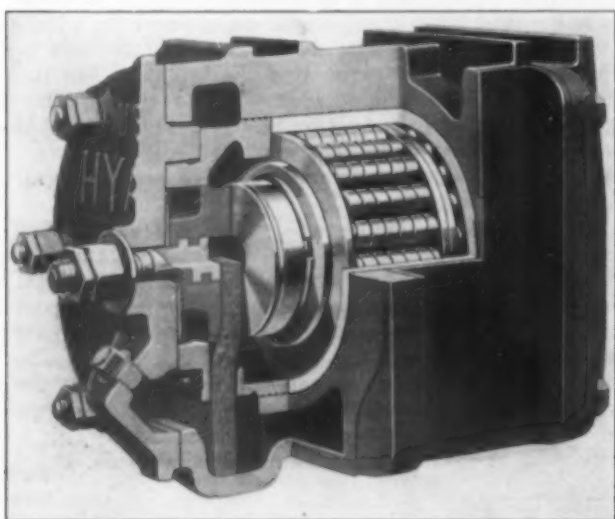


Safety Brake Step for Use on Freight Cars

without brackets to suit any style of brake ratchet, wheel or pawl. The application of this step in direct contrast to those of wood now commonly used, obviates any further expense for maintenance or renewals as it is made of rust-resisting steel plate and is practically unbreakable. The perforations in the top of the raised buttons prevent the treads from wearing smooth. As the tread wears down, the gripping edges of the holes are not destroyed.

## Modified Hyatt Roller Bearing Journal Box

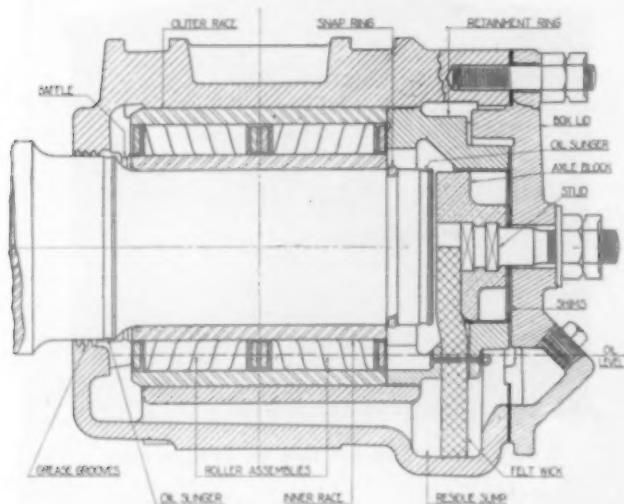
**I**N the modified journal box design of the Hyatt Roller Bearing Company, Newark, N. J., all likelihood of oil leakage is removed by a system of grease grooves which are just back of a baffle wall which catches any oil passing through the bearing and diverts it to an



A Section of the Journal Box Cut Away Showing the Hyatt Redesigned Roller Bearing

annular groove that carries it back to the oil reservoir at the bottom of the box.

Various methods of closing the journal box at the front have been tried, but the most successful design adopted so far is to have the box lid separate from the spacer casting which holds the axle block in place. By having the spacer casting separate from the box lid, there



The Hyatt Roller Bearing Journal Box

is definite assurance that the lateral play of the axle will bring the axle end square against the axle block thus holding it in place.

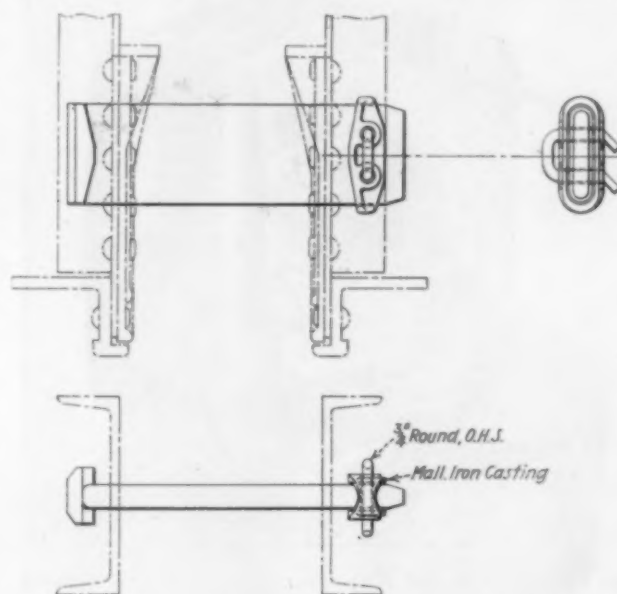
Further, in the original designs, the axle block was more or less insecurely held by offset bolts and locking devices, but in the design illustrated the axle block is a

floating element securely held against rotation by its square section, and laterally by the method of locking, as indicated.

The trucks in which this box are used are set up with a predetermined amount of permissible lateral movement of the axle. This is a very desirable but unusual design for a roller bearing journal box, inasmuch as it closely parallels the practice with A.R.A. journal box and truck construction. Shims interposed between the axle block and the cover lid permit precise adjustment of the lateral movement of the axle. It is considered that adjustment of the blocks to compensate for wear will probably be necessary only when the cars are shopped for heavy repairs, although the lateral play may be checked when desired by loosening the two nuts and pushing the block in and out and measuring the movement.

## Malleable Iron Draft Key Washer

**T**HE illustration shows the application of a draft key washer recently developed by the Pressed Steel Car Company, Pittsburgh, Pa. This device consists of a malleable iron washer or wearing piece applied to the tapered end of the draft key. This washer



Application of the Draft Key Washer with a U-Type Cotter Pin

is so designed that any thrust or pressure coming on the washer, due to the shifting of the key, will come at the center of the washer regardless of the angularity or position of the key in the slot. Where a U-bolt type of cotter is used for holding the washer in place the design has the effect of producing shear on both legs of the cotter at the same time, thus increasing the effectiveness of the cotter. As the washer encircles the entire cross section of the key the shear obtained in the case of the U-type cotter is quadrupled.

When the washer is held in place on the key with the standard brake pin double the shear is obtained on the pin. The head of the key is also made of such shape that the thrust coming on it is at practically all times in



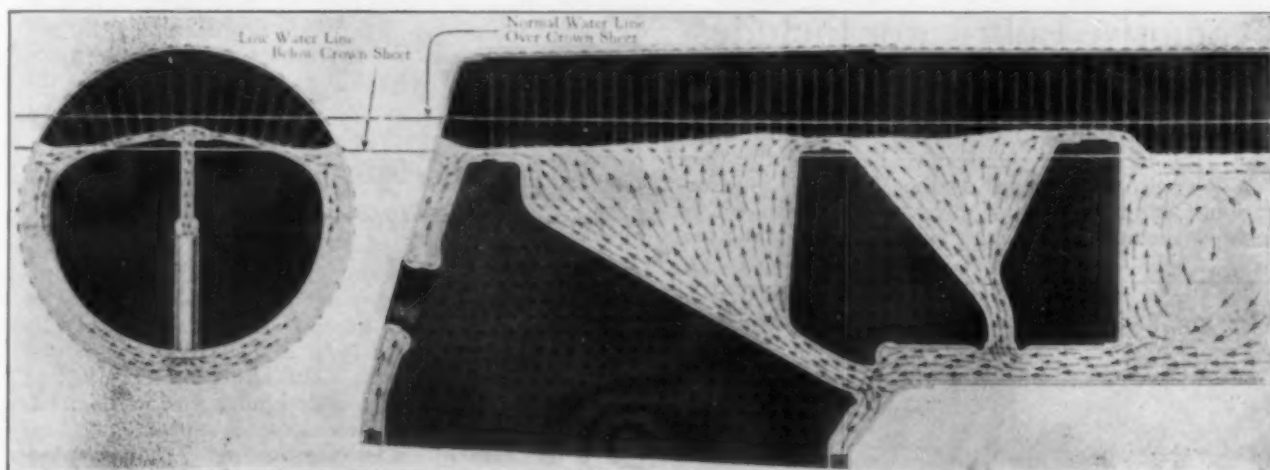
the longitudinal center of the key. This device is designed to eliminate the breaking of the draft key retainer and to insure against the loss of the draft key and the pulling out of the coupler due to this cause. It is also designed to minimize the possibilities of reduction of section of either the pin or the cotter by concentrating the chafing or wear of the sill due to the shifting of the key on the washer and head of the key.

## Combustion Chamber Syphon

**T**HE Locomotive Firebox Company, 310 South Michigan avenue, Chicago, manufacturer of the Nicholson thermic syphon, has placed in the market the combustion chamber syphon which is manufactured in a manner similar to the firebox syphon, but is set vertically in the combustion chamber, making a con-

The standard 16-in. dia. brake wheel is used with the cam gear brake, which is secured at the bottom of the car end sill somewhat similarly to the old type of brake step, the lower end of the brake staff fitting into a squared socket in the small sturdy pinion of the cam gear brake.

The illustration shows the cam gear brake with the top plate cut away so that the cam may be seen. The lever on the brake staff pinion has a preliminary engagement with the cam on the gear carrying the brake chain drum, which provides an extremely quick slack take-up, the cam being so designed that one-quarter turn of the hand wheel causes three inches of chain to be wrapped on the drum, thereby taking the slack out of the brake rigging. This feature is desirable since it materially reduces the time required to bring a moving car under control. In the illustration the pinion lever is shown leaving the cam slot and the first tooth of the drum gear being engaged by the pinion teeth.



Application of the Combustion Chamber Syphon

nection to the floor sheet by a diaphragm and to the crown sheet in the usual manner. The two syphons in the firebox are used with this arrangement. Because of the combustion chamber syphon, additional heating surface and circulation in the boiler are secured and in case of low water, protection is given to this part of the crown sheet, which otherwise would be unprotected.

The end of the cam is worked out so that there is always a positive engagement between the pinion and

## Power Hand Brake Mechanism for Freight Cars

**N**EW developments in power hand brakes for freight cars are embodied in the cam gear brake manufactured and sold by the National Malleable and Steel Castings Company, Cleveland, Ohio.

The cam gear brake is the result of careful study of the requirements of A. R. A. Standard Practice in regard to power to be developed at the brake cylinder push rod by hand brake mechanisms. Extensive development work has been carried on to design this brake so that it will deliver the required force under adverse as well as favorable conditions.

Actual car tests are said to have shown that this cam gear brake will develop a force at the brake cylinder push rod well in excess of the required 3,950 lb. without the use of a club, thus allowing a high factor of safety for extreme conditions.



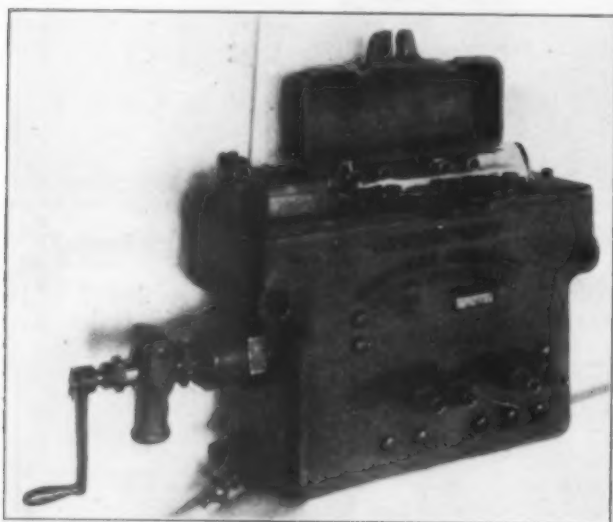
A View of the Cam Gear Brake with the Top Plate Cut Away to Show the Cam

gear and so that no abrupt shock in the transfer from the cam to the teeth can occur.

With the teeth engaged, the cam gear brake develops full power and continues to deliver this power to the brake chain throughout the remaining 14 in. of chain possible to be wrapped on the drum. Inasmuch as the auxiliary levers and sheave wheels are eliminated, with the attendant frictional losses caused thereby, the cam gear brake provides for a possible brake cylinder push rod travel of 17 in., thus allowing for a large margin of safety over the 9 in. of piston travel, which is the maximum allowable under A. R. A. rulings on brake adjustments. Furthermore, chain fouling on the drum is not possible since but one turn of the drum is necessary to take up this 17 in. of chain. This is an important feature as the fouling of the chain means a great loss of power.

## Locomotive Lubricator Includes Fluid Pressure Check Valves

**A** REDESIGNED lubricator, known as the Model HD locomotive lubricator, has recently been placed on the market by the Madison-Kipp Corporation, Madison, Wis., for providing fresh oil in measured quantities for the cylinders of locomotives.



Madison-Kipp Model H D Locomotive Lubricator

This new lubricator is built upon the Madison-Kipp valveless and registering port principle and with the Madison-Kipp fluid pressure check valves.

The new model includes individual adjustments for each oil feed and individual sight feed for each oil feed. Each pumping unit is adjustable without changing the stroke of the plunger. The range of adjustment permits any given outlet to deliver as high as eleven times as much oil as any other outlet in the same lubricator. The adjusting spindles are grouped directly in front of the sight feed and both are protected by a hinged hood cover. This cover can be sealed to prevent any unauthorized adjustment.

The valveless and registering port principle used in the lubricator assures that the oil quantities as determined by the adjusting spindles will be delivered through the sight feed and in turn be delivered to the cylinders. The fluid pressure diaphragm check valve is so designed

that the boiler pressure on the top of the diaphragm holds the valve in the closed position until the oil pressure from the lubricator raises the valve from the seat and permits the oil to be forced into the steam line. The diaphragm mechanism is so constructed that the boiler pressure exerts a valve closing action of 50 lb. more than the steam line pressure operating in the opposite direction. This, then, makes it mechanically impossible for steam or water to work back into the oil line. The oil line, also cannot empty itself while the locomotive is drifting with the throttle shut off.

The valve delivers oil into the steam line in an atomized condition by a jet of saturated steam, taken from the steam supply at boiler pressure. There is no spring adjustment in the check valve and it automatically regulates itself to any particular steam pressure. The complete elimination of springs in both the lubricator and the pressure check valve also makes effective lubrication much more certain in operation as the lubricator, in all instances, depends entirely on the mechanical action of the same elements as those which propel the locomotive. So long as the locomotive is running, the lubricator automatically delivers fresh oil in measured quantities to the cylinders.

## Lifting Rail for Automobile Cars

**T**HE present practice in loading assembled automobiles for shipment necessitates the lifting of one end and in automobile cars this is usually accomplished by a chain hoist suspended over the carlines near the ridge poles. The Hutchins Car Roofing Company, Detroit, Mich., in designing steel carlines has embodied the strength necessary to support any load placed on them in automobile loading. The latest development of this company is a loading rail running lengthwise of a car which permits the chain hoist to be



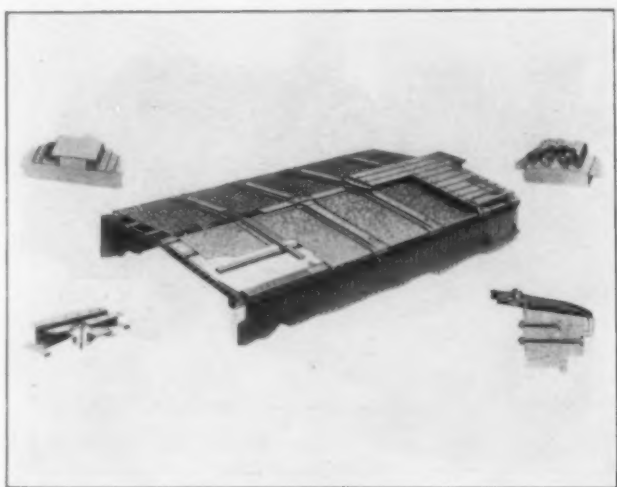
The Longitudinal Lifting Rail Permits the Suspension of the Hoist at Any Point

suspended at any point regardless of the location of carlines. This facilitates the loading of automobiles of varying wheel base lengths. This lifting rail is of a

channel section with side wings weighing 7.4 lb. per ft.—the same section as the Hutchins carlines—and in application is either riveted or bolted to the carlines. Its application provides an economical method of loading and also adds considerably to the strength of the car roof.

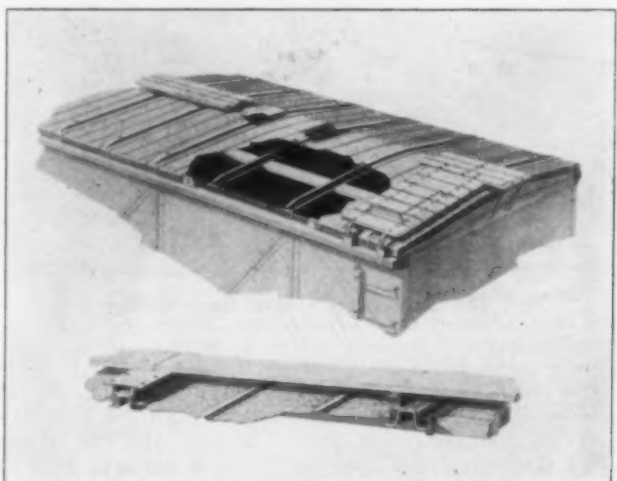
## Zenith and Chicago Flexible Car Roofs

**T**HE Zenith and Chicago flexible type of roofs, shown in the illustrations, have recently been placed on the market by the Chicago-Cleveland Car Roofing Company, 1617 Kimball Building, Chicago. The Zenith flexible outside metal roof is a heavy gage



The Zenith Flexible Outside Metal Car Roof

roof designed for repairs. This roof is recommended for use on cars where the carlines, ridge pole and pur-lines are in good condition, as it can be applied without disturbing them. Each roof sheet is flexible and is held



The Chicago Flexible Type of Car Roof

in a frame composed of the ridge cap and transverse caps which are in turn fastened at the ridge by a steel saddle and cap and at the eaves by anchor clips. Steel

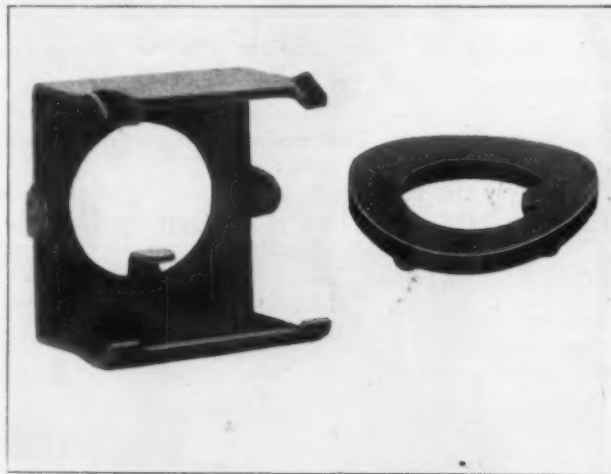
saddles are furnished as standard equipment with this roof.

The Chicago flexible roof is a heavy gage flexible type of roof, complete with carlines. The sheets extend across the car eliminating ridge seams. The cap formation, common to most flexible roofs, is formed in each sheet, thereby still further reducing the number of seams to a minimum. Each sheet of the roof is free at three sides and riveted to a carline on the fourth side. This construction controls the sheet during its movement when the car weaves, and centers the sheet again when the car has ceased its weaving and returns to normal position. This roof is furnished with carlines of open end construction to insure full ventilation. Metal running boards are furnished as standard equipment.

## Andrix Lock Nut and Washer

**T**HE Andrix Lock Nut Company, Locust and Michigan streets, Adrian, Mich., is marketing a lock nut and washer for use on cars and locomotives and in bridge construction. It is claimed that these locks have never failed to hold the nuts tight as a spring washer takes up all the stretch.

The washer is made of high-carbon spring steel. It has a tongue that engages a spline cut in the bolt body. A similar tongue in the locking piece also engages this spline and thus prevents the nut from turning. The lock is made of heat-treated crucible steel and is Parkerized to withstand the elements when used in the open



The Andrix Lock Nut and Washer for Use on Machinery, Cars and Locomotives

on cars or locomotives. It will not rust nor will it rattle off.

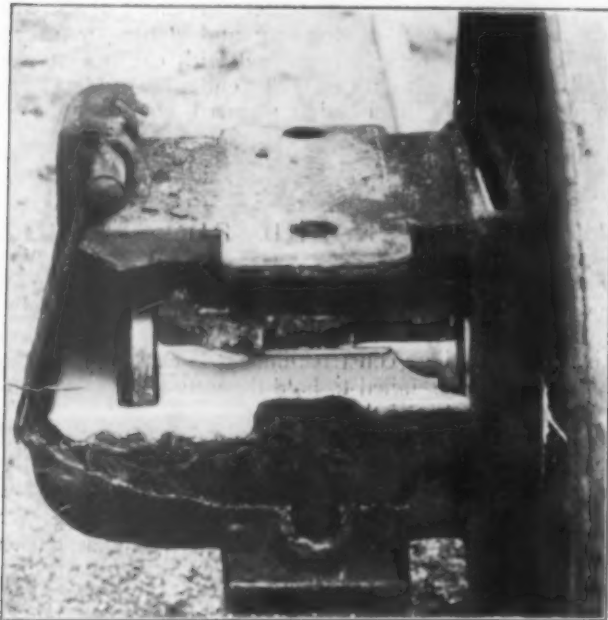
In applying the device, the washer is first slipped in place, followed by the nut, which is then tightened with one of the flat sides of the nut in line with the spline in the bolt. The locking piece can then be snapped in place. Four prongs grip the underside of the nut and prevent the lock from falling off. To remove the device, a screwdriver or other edged tool is inserted under the side of the lock close to the lower edge to spring the prongs free. These lock nuts may be used over again as often as is necessary.

The lock nut is made in both square and hexagon types in four sizes:  $\frac{3}{8}$ , 1,  $\frac{1}{2}$  and  $1\frac{1}{4}$  in. to fit standard nuts of the same sizes.



## Waste Retainer for Car Journal Boxes

**I**N an effort to overcome waste grabs as a cause of hot boxes, R. H. Dyer, general car inspector, Norfolk & Western, Roanoke, Va., has patented a retainer the function of which is to keep the waste below the center



Side View of the Waste Retainer with the Bearing and Wedge in Position

line of the journal. The retainer is made in one piece of 125 gage low carbon steel plate.

To apply the retainer, it is necessary to jack up the



Waste Retainer and Journal Bearing in Position

box, remove the wedge and bearing, insert the retainer and replace the bearing and wedge. The pressing of the waste incident to the jacking up of the box with the waste in position will be taken care of by the retainer which, by keeping the waste down at the sides of the

journal, will force it in contact with the entire surface of the lower half of the journal.

The retainer is already in service on 500 N. & W. cars and 1,000 additional cars are ordered to be equipped.

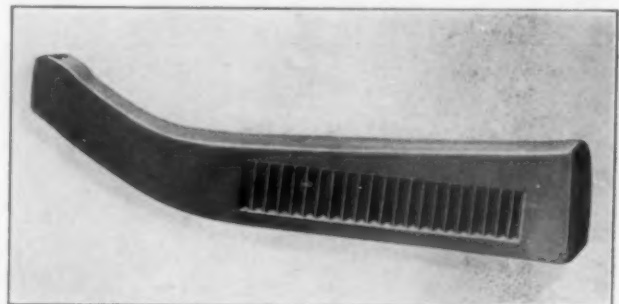
## Changes Made to Gold Steam Heat Connections

**T**HE 2-in. steam hose connection manufactured by the Gold Car Heating & Lighting Company, Brooklyn, N. Y., has recently undergone several changes. The drop forged wedge lock has been re-



The Redesigned Lock Wedge Applied to the Gold 2-in. Coupler Head

designed so that there is an excess of take-up for wear. The 2-in. coupler heads have been strengthened, especially at the wedge lock housing. This change has also been made in the smaller coupler head. The spring grooves formerly used in the gasket seat have been elimi-



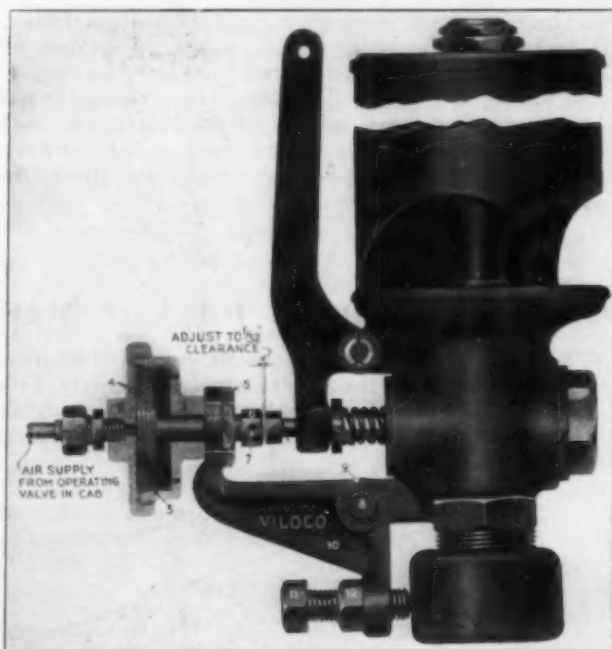
The Gold Drop Forged Lock Wedge

nated. The gasket can now be inserted in any position, allowing it to oscillate in all directions. The Gold No. 1,222, 2-in. end valve which is used with the 2-in. connection, is of the piston type. The end valve can be used as a stationary or sliding valve. It is made in both the screw and flange types.

A SUIT for \$1,000,000 instituted by George M. Taylor, receiver for the Cripple Creek Short Line, against the Cripple Creek Central, instituted seven years ago when the Colorado Springs & Cripple Creek District, a subsidiary of the Cripple Creek Central, made a lease with the short line and then cancelled it, was settled on May 27 for \$62,500.

## Viloco Pneumatic Whistle Operator

**T**HE Viloco Railway Equipment Company, 14 East Jackson Boulevard, Chicago, has recently placed on the market a device for pneumatically operating a locomotive steam whistle. This device provides a full instantaneous blast of the whistle at each operation. The air operated cylinder of the device is located on the whistle base with an air connection there-



The Viloco Whistle Operating Cylinder Can Be Applied by a Suitable Bracket to Any Type of Whistle

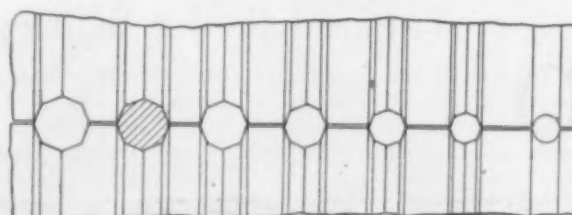
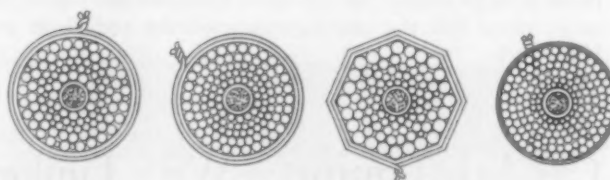
from to the operating valve in the cab. The operating valve can be located conveniently for operation by either the engineman's right hand, or his foot, thus relieving him of the time required to reach for a hand lever with his left hand. This device is applicable to any type of whistle by a suitable bracket. When desired, a second operating valve can be supplied on the left side in the cab for the use of the fireman in emergency cases.

## Seamless Hollow Rolled Staybolt Bars

**T**HE Old Dominion Iron & Steel Works, Belle Isle, Richmond, Va., is now using a patented process to manufacture on a production basis, hollow staybolt iron. The process consists essentially of building up a hollow fagot by arranging the rods around a hollow metal core, heating the fagot to a welding and rolling temperature, rolling the heated fagot down to the required size, at the same time preserving the desired direction of the hole through the axis of the bar. The core of the fagot is filled with a refractory material. After the billet is brought to a welding heat, it is passed through a series of polygonal rolls instead of circular rolls. The reason for this is that by passing the billet through a series of circular passes, a twisting action is set up which badly distorts and sometimes closes the hole

in the bar. From 16 to 20 passes are used to finish the bar. The last pass is circular in form.

The removal of the refractory material from the fin-

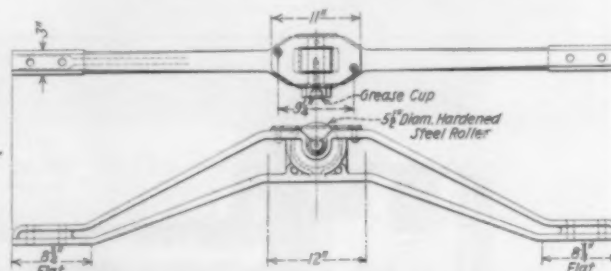


The Top View Shows Four Methods of Building Up the Billet—The Center View Shows a Detail of the Rolls and the Bottom View Shows How the Bore of the Finished Bar Is Cleaned

ished bar has always been a difficult and costly operation. This process has been simplified by chucking the bar in a lathe and turning it at about 500 r.p.m. At the same time a hollow metal tube is fed into one end of the cored bar. Air is blown through the metal tube. In this manner the hole in the bar may be quickly and adequately cleaned.

## Roller Side Bearings and Arch for Passenger Car Trucks

**T**HE illustration shows the Barber combination roller side bearings and arch for passenger car trucks, manufactured by the Standard Car Truck Company, McCormick Building, Chicago. The arch is made of cast steel with a pocket formed in the casting



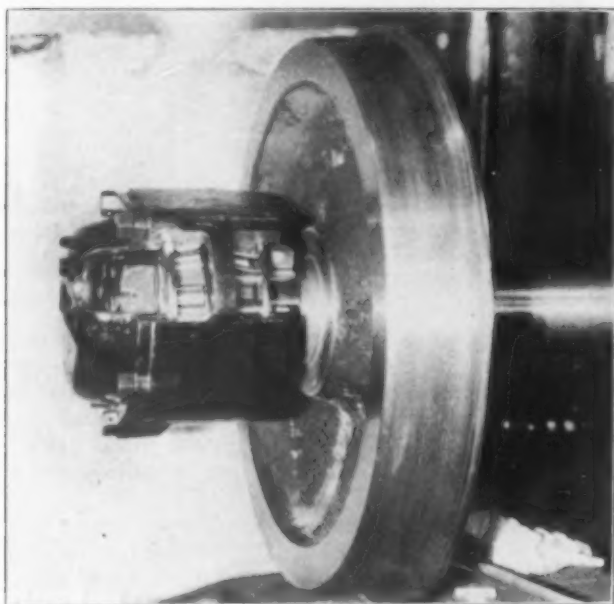
The General Dimensions of the Barber Combination Roller Side Bearing and Arch for Passenger Car Trucks

to take the 6-in. roller that revolves on the 2-in. pin. This pin has a key at one end that interlocks it to the arch, all the movement being between the pin and the roller. The pin is bored at one end for a grease recess which opens out at the center of the roller at the inside

of the pin, thus providing adequate lubrication. The cover plate keeps out the dirt, snow or ice. Should any of the parts prove defective, the car is safe to operate as there is only a very limited space between the top of the cover plate and the bearing plate on the passenger car body arch.

## Car Axle Equipped With Timken Tapered Roller Bearings

ONE of the features of the series of exhibitions which the Chicago, Milwaukee & St. Paul is making of its new Pioneer Limited before it starts on its first regular trip, is a complete Timken



Bearing Cut Away to Show the Assembly

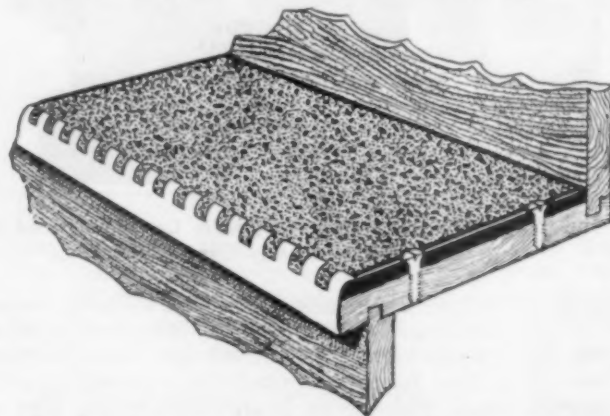
tapered roller bearing equipped axle, of the type used throughout the entire train, which were furnished by the Timken Roller Bearing Company, Canton, Ohio. Essentially the bearing consists of the cone, on which the rollers run, the rollers themselves, the cage, which holds them in position, and the cup, which encloses the whole

assembly so as to form a rigid unit. As can be seen from the illustration, the bearings are of the double type, that is, they consist of two sets of 14 rollers each, mounted on a common cone, and enclosed in a common cage. The whole is enclosed in a common cup, making a homogeneous unit. The cone has a double taper rising towards the middle. There is a ridge at the apex of the angle, and one at each of the outer rims of the cone, the latter being known as the ribs. It is these ribs, which are machined so that their inner surface is exactly parallel to the flat end of the tapered rollers, that compel the revolving roll to align itself.

The bore of the bearings is 5 in., the outside diameter, 11 $\frac{3}{4}$  in., and the width of the cone at its contact with the axle 6 $\frac{1}{4}$  in. The latter dimension means a considerable saving in the overall length of the axle and bearing housings. The rated capacity of the bearings is 34,000 lb. radial and 28,700 lb. thrust load, at 500 r.p.m., or what corresponds to about 55 miles per hour train speed.

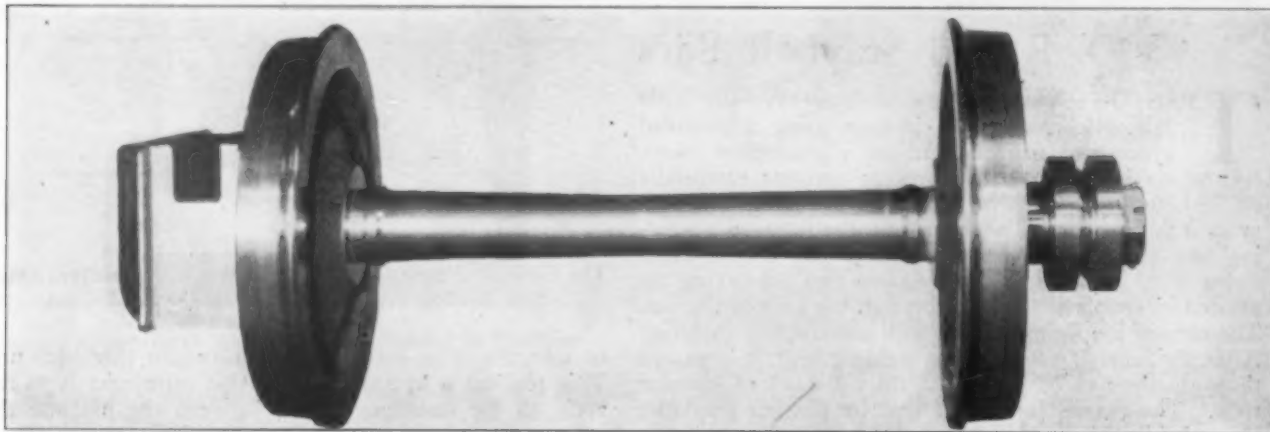
## Saftred Designed for Car Steps

THE illustration shows the Masonco Saftred manufactured by the American Mason Safety Tread Company, Lowell, Mass., designed especially for railroad cars. It consists of a flat tread with a nos-



This Safety Car Tread Has a Metal Base and Nosing

ing of alternate teeth, both of hard metal and abrasive material (carborundum), the two wearing down evenly together.



Car Axle, Showing the Complete Housing on One End and the Assembled Bearing on the Other

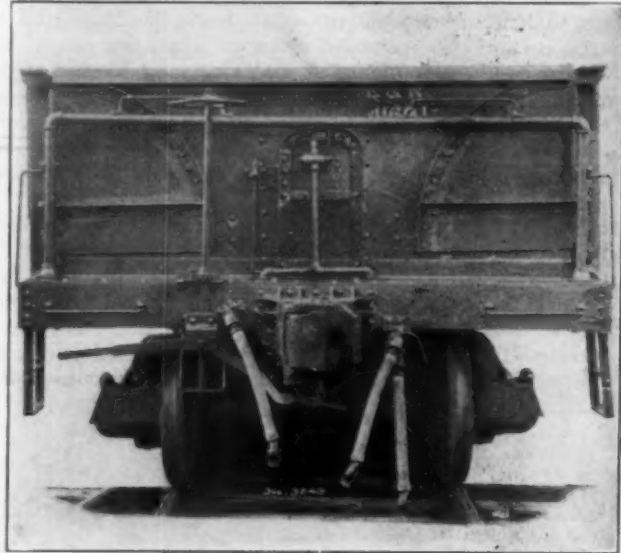


## Trunnion Type Air Dump Car

THE Pressed Steel Car Company, Pittsburgh, Pa., through its subsidiary, the Koppel Industrial Car and Equipment Company, has added a new trunnion type car to the line of Koppel air dump cars. This car is being produced in cubical capacities of 27 and 30 yd. level full, or 36 and 42 yd. heaped, and of 100,000 lb. capacity, but can be furnished in other capacities to meet special requirements. Some of the more important features of this car are as follows: Low center of gravity; 7 ft. 6 in. high overall from top of rail, permitting quick inexpensive maximum loading with steam shovel or crane and making the car attractive for ditcher service and well adapted for smooth riding on temporary tracks; quick, clean discharge of lading 7 ft. from center of tracks, which is especially valuable for ditcher service as the load not only clears the ties but also is distributed well out over the ballast; dumps to either side without changing any parts; dumping operation controlled by hand operated valves located at one or both ends of car; can be locked instantaneously so that the car cannot be dumped until the lock is released. When the lock is released the car will only dump to one side as desired and not to the other side until the lock is reset. The door operating mechanism is located at the ends of the car, no operating parts being along the side of the car to become damaged in dumping. The body locking devices have been entirely eliminated. The car body can be quickly moved to the dumping position and returned automatically by gravity after dumping to normal position without any shock to the car.

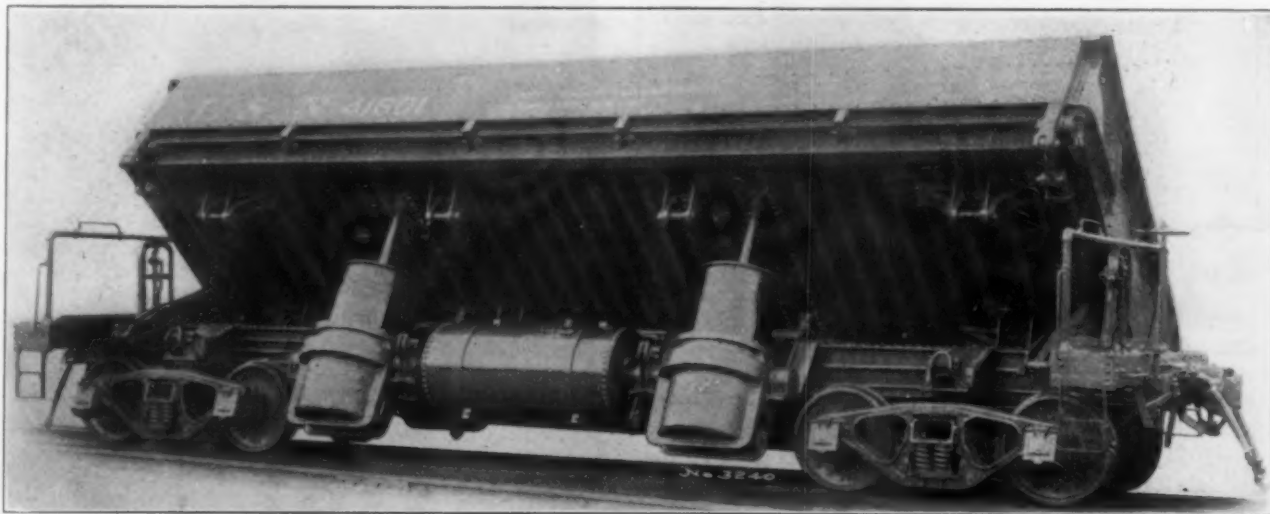
The illustrations show one of twenty 27-cu. yd. cars that were delivered a few months ago to the Louisville & Nashville. The body is built in a separate unit with

Four telescoping type cylinders, two on each side of the car are provided, which obtain air from a storage reservoir placed between two of the cylinders. Dumping is accomplished by turning the handle of the operating valve located at one end of the car. By a special de-



All Controls Are Conveniently Located at the Ends of the Car

sign of control valve any car in a train may be dumped individually, also a whole train of cars may be dumped either from any one car or from the locomotive. An indicator provides a simple means of determining the



27-Cu. Ft. Koppel Dump Car in Dumping Position, Showing the Operating Mechanism and Reservoir

$\frac{1}{2}$ -in. floor plate supported intermittently by means of cross beams so as to leave no unsupported area. The body when in load carrying position is supported by eight trunnions placed four on each side of the car, resting in a like number of sockets, thus providing rigidity, resembling in this respect a gondola car. The underframe center construction is composed of heavy steel channels with heavy top and bottom steel cover plates—a rugged steel structure framed into the center construction carries the dumping cylinders and trunnion sockets. Body bolsters are composed of double course pressed steel diaphragms with top and bottom cover plates.

side of discharge and when placed at the desired position a three-way valve located near the center of the frame is set automatically and controls the flow of air from the reservoir to the cylinders opposite the dump side. It also cuts off the air supply to the two dormant cylinders. All four cylinder piston rods are permanently connected to pins attached to the frame of the car body, which permits the two active, as well as the two idle, cylinders to swing in their respective sockets during the dumping operations.

As the air is released from the reservoir to the two cylinders on the side opposite the desired side of dis-

charge, the body is gradually raised with the low or discharge side resting in the four trunnion sockets on the dumping side which serve as pivots. When one side of the body ascends, the door on the discharge side is permitted to lower itself, since its automatic action is mechanically controlled by levers. It serves as an apron for distributing the lading away from the track and in special cases as a plow or spreader when the empty car hauled away. By means of an exhaust or bleeder valve which is automatically set in action when the handle on the operating valve is returned to the running position, the air is gradually released from the cylinders, thus allowing the body to resume its normal load-carrying position without shock.

The car illustrated in this article represents the Koppel trunnion type car with double plate sides, hinged to the body side sills and operated from the ends only. For general service where a lighter constructed car is desired, this type of car with single plate sides or doors is recommended, the sides being hinged to the body side sills and operated by a series of levers located underneath the body.

## Changes in Power Reverse Gear

SEVERAL changes have recently been made in the design of the power reverse gear built by the Barco Manufacturing Company, 1815 Winnemac avenue, Chicago. The new Type B4 reverse gear is fundamentally the same as the B2 and B3 gears, except that the various parts have been made more easily ac-



Redesigned Barco Power Reverse Gear

cessible and the general arrangement considerably refined. The valve has been placed on the bottom so that the lubricant will be better distributed to the walls of the cylinder. The rack has been lightened by making it in a half-round section instead of rectangular. The gear sector bearings are now in one piece instead of two.

## Brake Pipe Clamp and Angle Cock Holder

MUDGE & COMPANY, Railway Exchange Building, Chicago, has redesigned and placed on the market a brake pipe support and clamp and a combination brake pipe clamp and angle cock holder. Both devices are one piece and made of pressed steel, utilizing an ordinary  $\frac{3}{4}$ -in. bolt to effect the clamp-

ing of the pipe. The clamping principle of these devices is simple. When the brake pipe or angle cock is in place, the  $\frac{3}{4}$ -in. bolt is applied and drawn up tight. This action draws the legs of the clamp inward and they in turn bear on the bolt and force it hard against the pipe. The pressure of the bolt and large bearing sur-



A Combination Brake Pipe Clamp and Angle Cock Holder

face of the clamp against the brake pipe resists vibration or movement of the pipe. The nut is automatically locked by the angularity of clamp legs and their natural resisting action.

The angle cock holder is provided with a lip which projects over the hex of the angle cock, preventing the



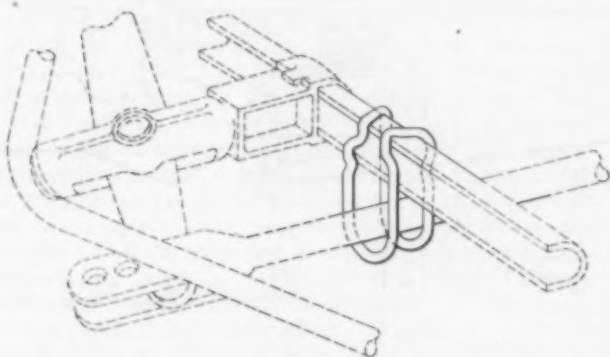
The Mudge Brake Pipe Support and Clamp

latter from turning. The combination of this lip and clamping of the pipe back of the angle cock prevents distortion or loosening. Variation of as much as  $\frac{1}{2}$  in. in length of the brake pipe nipples applied in renewals do not affect the efficiency of the angle cock holder. It will still serve its purpose without having to be relocated.

A. KASTELLO has been appointed district sales representative of the Detroit Stoker Company, Detroit, Mich., for its eastern Canada and Montreal territories, with headquarters at 915 New Birks building, Montreal. Mr. Kastello formerly served for many years with different railway companies in Canada as mechanical engineer and power plant efficiency engineer.

## Creco Bottom Rod Guard

**T**HE Chicago Railway Equipment Company, Chicago, has recently developed the Creco bottom rod guard, for safeguarding the bottom brake connection on freight and tender trucks. In this guard, double U-springs clamp tightly over the brake beam compression member and encircle the bottom rod, which, if



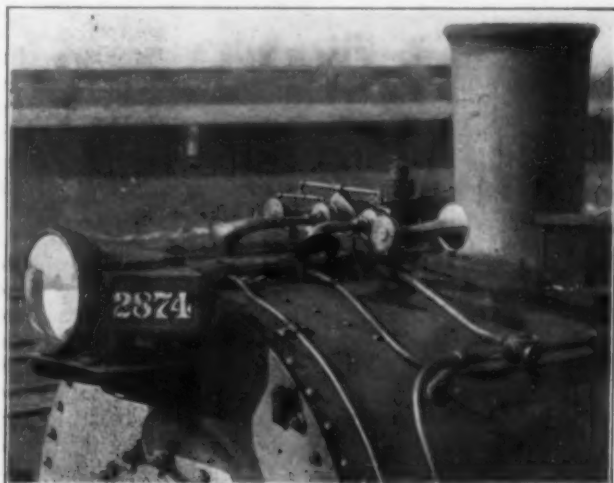
The Creco Bottom Rod Guard for Safeguarding the Bottom Brake Connection

it should fall, would be prevented from dragging along the ground. Rattling of the guard on the beam is prevented by lugs which grip the edges of the section. The guard is applicable to any style of trussed brake beam.

## Air Signal for Locomotives, Motor and Electric Cars

**A**N air signal for locomotives, motor and electric cars, yards and signal towers, has been developed by the American Strombos Company, Inc., Eighteenth and Market streets, Philadelphia, Pa. The signal operates on from 10 to 100 lb. air pressure, regulated by the construction of the air inlet.

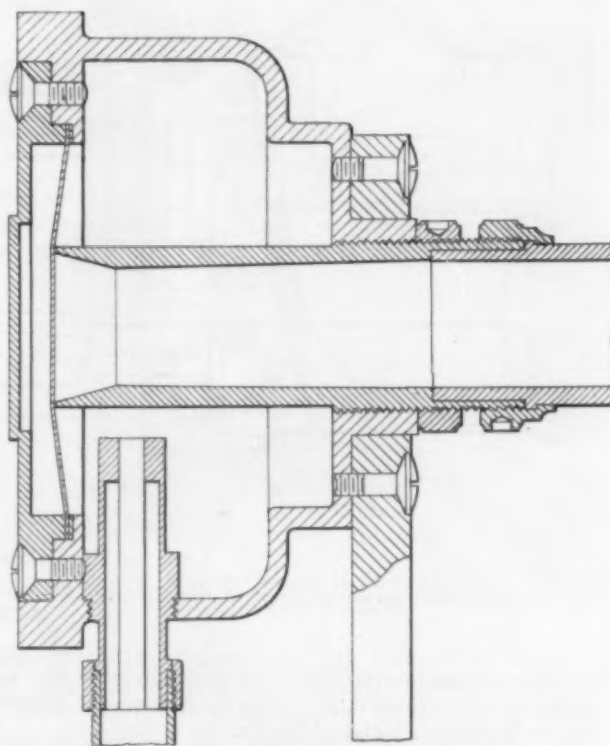
The inside of the signal consists of a bronze diaphragm



Assembly of Four Strombos Units, Two Curved Projectors Pointing Ahead and Two Straight Projectors Pointing to the Rear

which emits no sound itself, but releases a succession of air waves, which by resonance are so amplified in intensity as to penetrate other noises. The initial sound waves arising from the high frequency, pulsating, air pressure in the chamber, created by the vibrating diaphragm-valve, excite the column of air in the bell, or resonator, into sympathetic longitudinal vibrations; greatly magnified, these are projected to the outside air as sound waves of extraordinary power.

The horn is equipped to be attached to an air line and



Cross-Section of the Strombos Air Signal

will not affect the air brake system. It is operated with the regulation lever valve and cord or with a foot control. If desired, a magnet valve can be furnished for remote push button control. The signal is furnished in many models with any number of signal units assembled together. Either the straight or the curved type of projector can be furnished in various lengths by which the tone of the signal can be regulated to meet most every requirement.

## Boec Locomotive Cylinder Mechanical Lubricator

**T**HE cylinders of steam locomotives are now lubricated by means of mechanical or hydrostatic lubricators which function by releasing, from time to time, a drop of special oil into the steam before it enters the valve chamber. This oil must have the property of blasting itself into small particles which are sustained in the steam in a state of colloidal suspension. The steam deposits some of the oil on any surfaces, with which it comes in contact, such as the steam pipes, the valve chambers, the port passages, the cylinder heads, the piston heads and finally, the cylinder walls. The advent of



high steam temperatures made this method of lubrication somewhat more difficult. It seems desirable to deposit the lubricant on the cylinder walls when the temperature is at its lowest point. This led the Baltimore Oil Engine Company, Eastern avenue and Thirty-first street, Baltimore, Md., to develop under the Wygodsky patents a new method of lubrication of the steam cylinders, which is designated as the Boec system of direct

the front dead center. Thus, the oil is not deposited on the piston head, but instead, approximately on the middle of the cylinder surface where the piston velocity is the highest, and therefore, where the oil is most needed. The oil is injected at the period when the steam is exhausting from the rear exhaust port. At this point in the steam cycle the cylinder walls and contents are at approximately their lowest temperature. Only a small

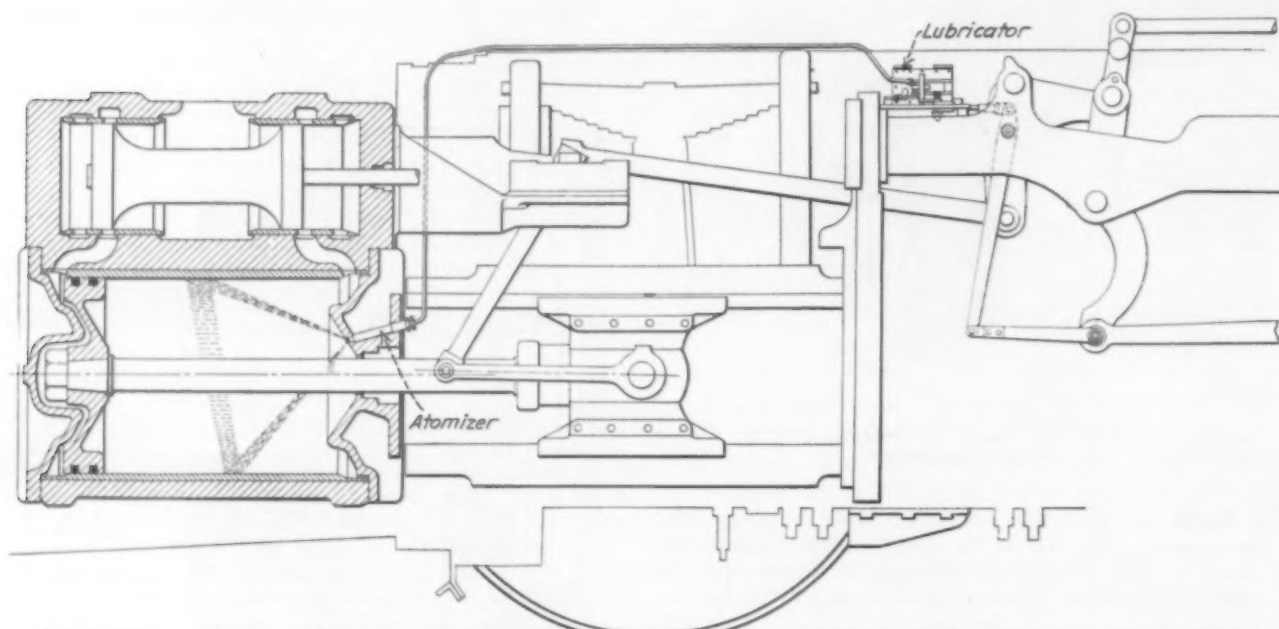


Fig. 1—The Cross-sectional View of the Cylinder Shows How the Cone-shaped Oil Spray Strikes the Cylinder Wall and the Piston Rod

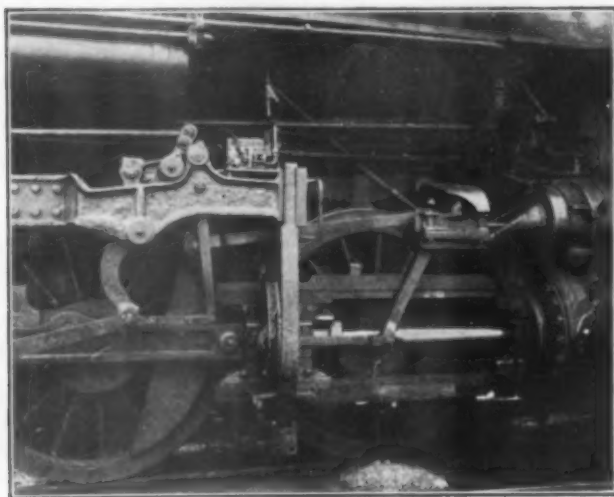
spraying of the lubricating oil on the cylinder walls. The device is sold and serviced by the E. A. Lundy Company, Fulton Building, Pittsburgh, Pa.

The principle of the direct spraying of the lubricant into the cylinders is illustrated in Fig. 1. An oil atomizer which is located in each back cylinder head in such a position that a hollow cone spray forced in under 2,000

percentage of the oil mixes with the steam, the high velocity with which it is driven into the cylinder carrying most of it directly to the cylinder walls to which it adheres. Sufficient oil is picked up and carried by the steam to lubricate the valve chamber bushings and the valve stem. The oil is injected intermittently, say once in 30, 40 or 100 revolutions of the locomotive driving wheels, depending on the class of service.

The atomizer in the back cylinder head consists of a hollow stem valve with a mushroom head, which is opened by each 2,000-lb. oil pressure impulse and seated again by the action of a heavy coil spring around the valve stem. The travel of the valve is controlled by an adjustable collar on the inner end of the valve stem. Just back of the mushroom head are six tangential holes which lead into the hollow stem through which the oil is fed. When the valve is forced open by the oil pressure, oil is forced through the six holes into the space between the valve and its seat, which is so proportioned that the spray issues in hollow cone form.

Several sectional views of the lubricator proper are shown in Fig. 2. Referring to Section A-A, one end of the primary plunger is attached to a crosshead in which is located a rack and pinion. The pinion is oscillated one for each revolution of the locomotive wheels and each oscillation completes a double stroke of the plunger. The primary plunger draws oil through a double filter, up through the suction valve and delivers it through a discharge valve into a chamber above a comparatively large discharge piston, thus causing the discharge piston to recede slightly with each stroke of the primary plunger. At the same time some of the oil from the primary plunger is fed through to a chamber above a small sec-



The Boec Lubricator Applied to a Mikado Locomotive

lb. per sq. in. pressure, intersects the cylinder walls.

The oil is injected in a timed relationship with the movement of the piston when the piston is at or near

ondary plunger, section C-C, which is connected to and recedes with the large discharge piston.

Located in the end of discharge piston stem is a pin which acts against a spring. After a given number of revolutions of the driving wheels, depending on the feed adjustment, this pin is pressed against a trigger, section C-C, the end of which is ultimately moved down until it engages a tooth on an oscillating bracket as shown in Section D-D. The toggle action of the trigger and the link to which it is attached, caused by the trigger with the swinging bracket, opens an oil air valve which admits compressed air from the brake system to the lower side of the discharge piston. At the same time an oil return valve is opened to permit the unrestricted flow of oil from the chamber above the discharge valve, back to the reservoir. Owing to the differential in the diameters of the discharge piston and the secondary plunger, above which a small volume of oil is now trapped, 90-lb. air pressure develops 2,000-lb. oil pressure and the upward movement of the secondary plunger forces a small amount of oil through the discharge pipe to the atomizer, at this pressure. With the end of the discharge piston removed from the trigger, it is returned to normal position by a coil spring. The use of air for discharging the oil makes it possible to produce the same character of spray irrespective of the speed of the locomotive.

Another feature of the lubricator is that it is possible, before starting on a trip, to lubricate the cylinders manually. This enables the engineman to check up the working of the lubricator as well as to fill the oil pipe connecting the lubricator with the atomizer. The lubricator is provided with a steam chamber for heating the oil. Experience has proven that it is not necessary owing to the high hydrostatic pressure and the fact that the atomizers are located in the back cylinder heads.

One of the illustrations shows the Boec lubricator as applied on a Mikado type locomotive. After six months service, the cylinder walls were examined and found to be covered with an evenly distributed film of clean lubricant and not with the usual muddy oil. The valve chambers and valve stems were also found to be adequately lubricated.

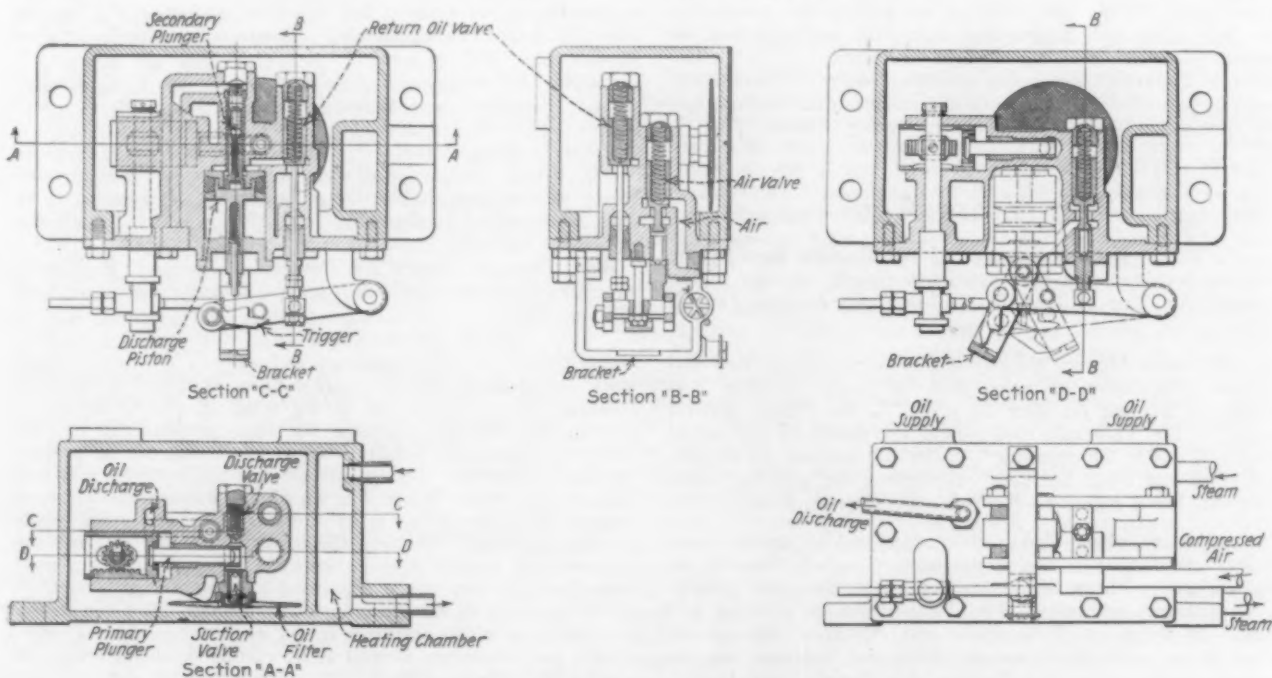


Fig. 2—Sectional Views of the Boec Locomotive Cylinder Lubricator

## Insulated Metallic Steam Heat Connection

THE illustration shows an insulated metallic steam heat connection, marketed by the Barco Manufacturing Company, 1815 Winnemac avenue, Chicago, for use on the rear end of locomotive tenders



Barco Insulated Metallic Steam Heat Connection, Made in 1½-in. or 2-in. Sizes

and between passenger cars. The connections are made for both 1½-in. and 2-in. full area passages and for all types of end valves and coupler heads. These connections are provided with large openings in the balls which eliminates any restriction either in the central or the extreme extended position.

## Looking Backward

### Fifty Years Ago

A Paris tribunal has inaugurated an awkward precedent, after several years' consideration, by imposing upon the five promoters of the ill-fated "Memphis & El Paso Transcontinental Railway" scheme a fine of \$400 for each \$1,000 bond sold in France, with interest from May 21, 1872, in addition to the penalty of imprisonment already decreed.—*Railway Age*, June 7, 1877.

"Rumor" which sent Mr. Vanderbilt abroad to arrange for a European steamship line, now decides that his mission was "to consolidate the New York Central and the Erie under one arrangement, with a view to pooling its earnings"—a very handsome project, and yet one which would appear to need more consideration than would be afforded by a week's visit in England.—*Railway Age*, June 7, 1877.

### Twenty-Five Years Ago

W. T. Noonan, chief clerk to the vice-president and general manager of the Minneapolis & St. Louis, has been appointed superintendent.—*Railway Age*, June 6, 1902.

"In the future, we must have pro-legislation, not anti-legislation," said E. H. Harriman in an interview at New York on June 2. "The time of the Interstate Commission is passed. In the future no great trunk line should be obliged to submit to a body that has no practical knowledge of railroading."—*Railroad Gazette*, June 6, 1902.

"All public service should be regulated by fair and reasonable laws," declared James J. Hill, president of the Great Northern, before the Illinois Manufacturers Association at Chicago on June 4. "\*\*\*\* But should the Interstate Commerce Commission be given rate-making power, it would have absolute dominion over the commerce of the country. It is to be feared that evils would result from the granting and exercise of such power, compared with which existing evils are as nothing."

Chauncey Depew, chairman of the board of directors of the New York Central & Hudson River, commenting on Mr. Hill's address said, "While not believing in government ownership, I do believe in such government control of railroads that all discrimination and extortion will be prevented \*\*\*\*. The Interstate Commerce law needs amending badly. The railroads should be permitted to form pools and make mutual business and rate agreements."—*Railway and Engineering Review*, June 7, 1902.

### Ten Years Ago

L. C. Fritch, general manager of the Eastern lines of the Canadian Northern, has been appointed general manager of the Seaboard Air Line at Norfolk, Va.—*Railway Review*, June 2, 1917.

A controversy between the city of St. Louis and the Terminal Railroad Association of more than 10 years' duration was brought to a close on May 19 when T. M. Pierce, general counsel of the Terminal, filed formal acceptance of ordinances which will enable the company to materially increase its storage, team track and other facilities for handling the growing traffic of the St. Louis gateway.—*Railway Age Gazette*, June 1, 1917.

According to plans filed with various public service commissions the Boston & Maine proposes, as a war measure, to eliminate nearly 20 per cent of the total passenger train mileage on its summer schedules. The Philadelphia & Reading will remove 30 trains at Philadelphia and the New Haven will cancel 10 per cent of its service, while the Southern has announced similar reductions.—*Railway Age Gazette*, June 1, 1917.

## New Books

### Books and Articles of Special Interest to Railroaders

(Compiled by Elizabeth Cullen, Reference Librarian,  
Bureau of Railway Economics, Washington, D. C.)

#### Books and Pamphlets

*Aircraft Year Book 1927.* Reviews accomplishments of 1926 in air commerce and civil and governmental aviation in this country and abroad. Illustrated. 410 p. Pub. by Aeronautical Chamber of Commerce, New York City. \$5.25.

*Art de l'Ingénieur et Métallurgie—Résistance des Matériaux et Données Numérique Diverses*, edited by L. Descroix. Extracts from Volume V of Tables Annuelles de Constants et Données Diverses, and containing tables compiled from authoritative sources in several countries of mechanical and thermic constants, and technical data on metals and alloys, as well as constants. Subject bibliographies also included. The sections on wood, steel, concrete, and lubricants will interest railroaders, while column 3 (English) in the four-language table of contents affords a key to the information. 249 p. Pub. by Gauthier-Villars et Cie., Paris, France. 125 francs, bound.

*Production and Movement of Fruits and Vegetables, United States, 1925*, by Bureau of Railway Economics. Its Bulletin No. 20 of the Commodity Price series, on production and distribution of the sixteen major fruit and vegetable crops grown by farmers in the United States. 19 p. Pub. by Bureau of Railway Economics, Washington, D. C. Apply.

#### Periodical Articles

*Has Taylorism Survived?* by Dexter S. Kimball. Brief review of shop management developments. *Mechanical Engineering*, June, 1927, p. 593-594.

*How Regulate the Bus and Truck?* by Charles W. Stark. Suggested answers to a question that is exercising more than one mind. *Nation's Business*, June, 1927, p. 32-34.

*New Styles in Bridges*, by Fitzhugh Green. Changing traffic demands and other factors that have affected bridge design. Illustrated, *World's Work*, June, 1927, p. 132-139.

*Outdoor Recreation for Industrial Employees.* Nineteen steam and electric railroad companies reported their activities in this line of the total of 319 industries answering the Department of Labor's questionnaire. Illustrated. *Monthly Labor Review*, May 1927, p. 1-16.

*Turbine Locomotive for British Railroad*, by F. C. Livingstone. Ljunström type locomotive as adapted to British conditions. *Scientific American*, June, 1927, p. 395.

*What Is Known About the Effect of Smoke on Health*, by W. C. White. In particular what was found out in an investigation of conditions in Pittsburgh, and what yet remains to be done. *Mechanical Engineering*, June, 1927, p. 655-657, with discussion, p. 657-662.

*Wins Diamond Award for Conserving Fuel.* J. R. Falvey, an engineer on the Southern Pacific. *Scientific America*, June, 1927, p. 413.

AN APPEAL to all enginemen and firemen on the Chicago, Rock Island & Pacific to increase their vigilance at highway crossings has been sent out in the form of a letter by L. C. Fritch, vice-president. Among the rules emphasized are the following: Sound the whistle whether any traffic can be seen on the highway or not. Do not assume that the motorist will stop close to the track; sound the whistle to awaken his sense of danger. Stop the train, if by doing so, we can avoid grade crossing accidents; not only the occupants of the car, but the engineer and fireman may be injured. Firemen should always remember that they are in a position to prevent injury and loss of life by being on the alert, especially through cities and towns. It is the duty of the trackmen to aid in this campaign by maintaining good crossings as well as by cutting down the weeds on approaches to the crossings.



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## Odds and Ends of Railroading

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### The Path-Makers\*

By Selden Lincoln Whitcomb

When we first met,  
We three,  
The blades were knee-high in the cornfields.  
When we last parted,  
We three,  
The wheat was stacked for the threshing,  
The buckwheat gleamed in the moonlight,  
The white-throated sparrows had vanished,  
The frost was white on the grasses.

The location gang bequeathed us,  
Blueprints in a room above the store;  
A broken line of wooden stakes,  
Stretching ten miles  
From the house of Widow Baker  
On Maple Street,  
Through oats and corn, through meadow, orchard,  
Along the slough and up the hill  
To Farmer Pitkin's yard  
And snug beside his rusty barn;  
Yes, bench-marks also,  
To right and left of the broken line—  
When one could find them.

We worked in calm and wind,  
In sunshine and in thunder-storm,  
In heat that blistered flesh and whirled the brain.  
The early morning saw us on our way,  
And whippoorwills were fluting at our supper-time.

At night, all still below,  
In the tiny upper chamber,  
(Full of tobacco smoke and muttered cursing.)  
We worked on estimates  
Of areas and cubic contents  
Of cut and fill,  
Until the village clock tolled loud:  
One—two—three—four—five—six—  
Seven—eight—nine—ten—eleven—twelve.

And far afield,  
Into hardened soil we wormed the rod  
To find first shale and stone;  
We waded the stream to mark the bridge  
And we three tramped, tramped, tramped,  
We three,  
With axe and rod and level,  
Along the tangent, around the curve,  
In dust and mud and clay and thorny tangle,  
Sweating, freezing,  
Hungry, thirsting,  
Cursing, praying,  
Sometimes fagged and failing;  
For we were the resident engineers  
And the rails, the rails, were creeping close.

These too were ours:  
Ripe plums in the shady orchard,  
Cold water at Big Spring,  
Noon rest beneath the wayside poplars!  
Eggs in the meadowlark's nest,  
The song of the indigo bunting  
Through the August sultriness,  
And the warble of vireo, bobolink, thrasher.

When we last parted,  
We three,  
When we last parted,  
With "So long, boys,"

When we last parted, parting forever,  
The frost was glistening on the rails  
From Winona into Dover,  
And the steam of Number One—  
("Hurrah, boys, hurrah!")—  
Soared white against the blue November sky.  
Today they whirl along our path—  
(With not a thought of us,  
Us three, path-makers)—  
The sallow banker to the surgeon,  
The priest to his new parish,  
The maiden to her wedding,  
The sinner toward the Judgment Day,  
And the unborn babe unto its birth.

### The Locomotive as a Clergyman

The Illinois Central Magazine for May contains the confession of a Brookhaven, Miss., business man who credits his salvation to the sermon preached by an Illinois Central locomotive. The man is Robert H. Guess, formerly a lumberman and now an evangelist. Mr. Guess' first sight of engine No. 1077, fresh from the shops and perfect in every appointment, moved him deeply. Even the number appealed to him, for he was born in the tenth month of '77. The sight made him resolve to forsake the ways of sin. He continues: "And I tried mighty hard, too. I gave up my bad habits and went to work. Every night when the old 1077 would come through Brookhaven, I would wake up at her whistle. I'd know it today if I heard it in Africa. It seemed to say to me: 'Whoo! Whoo! Why not you?' Meaning, of course, why wasn't I the full stature of man, just as it was of engine." Then a lapse from right living left him conscience stricken. In this frame of mind he walked through town. Down by the railroad he saw the wrecker come along towing his favorite engine, which had also got off the right track. And the engine seemed to say to him: "I'll be all right soon and doing my duty once more. Whoo! Whoo! Why not you too?" And that challenge started him on the right road once more.

### They Treat the Hound Dogs Well in Missouri

Down in McBaine, Mo., where Katy passengers detrain from main line trains to board a branch line train, for Columbia, which latter is presided over by Conductor John Day, there is a remarkable dog—remarkable because he has learned where and how to get a free meal from the M-K-T railroad any time of the day or night, according to the Columbia Missourian.

Jack is this dog's name. He is owned by George Sapp, night operator at the Katy station in McBaine. When a through train pulls into the station, Jack arouses from his sleep, if he happens to be at the station, or comes trotting down from his home in McBaine. He waits until the train stops and then runs along the line of cars until he reaches the dining car. Generally the dining car steward or a waiter is there to greet him and throw him a bone. If there is no one at the open door of the vestibule he makes his wants known. He barks until some one appears with his meal. All of the dining car employees on the line know him, and have learned to expect him. He never misses a dining car, day or night, and his daily meals total the number of dining cars that pass through.

Jack has been doing this for years, and his sleek, fat appearance shows how well fed he is, as a result. Local trains on the main line and the branch mean nothing in his life. He knows when the through trains with dining cars are due and his unerring sense of smell enables him to "spot" the dining car in the dark. Local trains rumble in and out, and he will not arouse from his sleep in the shade of the station, or in the station office.

\*This poem won the Kansas poetry prize in 1924. It was first published in "Poetry: a Magazine of Verse" in August of that year.



Florida East Coast—Photo by M. B. Cooke

THE AMERICAN SOCIETY for Testing Materials will hold its thirtieth annual meeting at the French Lick Springs Hotel, French Lick, Ind., June 20-24.

JOHN BANNON, a vice-president of the Brotherhood of Railroad Trainmen since 1911, with headquarters at Chicago, died on May 23 in that city, aged 55 years. Mr. Bannon's home was in St. Louis, Mo.

AN ARBITRATION BOARD is holding hearings on the demands of maintenance of way employees of the Louisville & Nashville for an increase in pay of five cents an hour. The board consists of Judge Charles Kerr, Lexington, Ky., Colonel L. L. Morton, special engineer of the Louisville & Nashville, and T. C. Carroll, vice-president of the maintenance of way employees' organization.

THE CHICAGO & EASTERN ILLINOIS has been authorized by the Interstate Commerce Commission to operate certain branch line trains and locomotives over its main tracks in train control territory without such locomotives being equipped with automatic train control apparatus; the condition being that the branch line train shall be run over the main line track for not more than five miles.

ONE WOMAN WAS KILLED and twenty-five persons were injured, six seriously enough to be taken to a hospital, when the second section of the California Limited of the Atchison, Topeka & Santa Fe, en route from Los Angeles, Cal., to Chicago, struck the first section two miles west of Flagstaff, Ariz., on May 23. The observation car and three sleepers of the first section of the train, which was standing on the main line at the time of the collision, were damaged.

THE NEGRO VETERANS in the service of the Central of Georgia, including a number who have been pensioned, were entertained by the company at a barbecue on the afternoon of May 26, in the Central City Park at Macon. About 150 employees were present, including seven who have served more than 50 years. William Henry Taylor, of Montgomery, Ala., pensioned crossing watchman, has a service record of 59 years. President J. J. Pelley presented

emblems to each veteran, and Mr. Pelley and other officers of the road made short addresses.

THE GREAT NORTHERN celebrated the seventieth anniversary of its existence recently when it displayed at St. Paul, Minn., a prospectus of the Minnesota & Pacific, published in New York in 1858 which contained an outline of the charter issued to the latter company on May 22, 1857. The charter of the Minnesota & Pacific, approved by the first railroad legislation enacted in the Territory of Minnesota, covered the construction of a line from Stillwater, Minn., to Breckenridge, via St. Paul. The charter provided that a bell should be rung or a whistle blown at each road crossing, with violations subject to a fine of \$50, half to be paid to the informer and half to the Territory.

#### To Ask Reduction in Corporation Tax

A specific demand for the reduction of the corporation income tax will be presented by the Chamber of Commerce of the United States when the new Congress assembles next December. A reduction of the corporation income tax rate to 10 per cent from the 13½ per cent rate should be made, it is held, even if it were to involve a deficit at the end of the fiscal year, on the ground that the imposition of so heavy a burden upon productive enterprise is wrong in principle and retards the economic development of the country. George M. Shriver, vice-president of the Baltimore & Ohio, is a member of the committee on taxation, which makes this announcement.

#### O'Fallon Order Postponed for Court Proceedings in Fall

The Interstate Commerce Commission on June 1 announced a further postponement of the effective date of its order in the St. Louis & O'Fallon recapture valuation case, in which the O'Fallon was ordered to pay to the commission \$226,880 as its excess income for 1920-1923 on the commission's valuation basis. The date

was recently postponed from May 15 to July 15 and the further postponement is to November 15. This is to allow additional time for the court proceedings on the application of the company for an injunction restraining the enforcement of the commission's order. An agreement has been reached among counsel in the case that the hearing before the court shall be held as early as possible after October 3.

#### Railroads Congratulate Captain Lindbergh

The railroads of the United States, through the Association of Railway Executives, in conference on May 27 at Atlantic City, extended to Captain Charles A. Lindbergh their heartiest congratulations on his "magnificent achievement in flying, single-handed and without stop, from New York to Paris" and tendered to him such transportation facilities as may best suit his plans and convenience for his return to his home. In proposing the resolution, President R. H. Aish-ton of the Association of Railway Executives said it had been suggested by President W. W. Atterbury of the Pennsylvania and that he had discussed the matter with Chairman Esch of the Interstate Commerce Commission. Mr. Esch had written a letter saying the commission would be very glad to issue an order without delay on request of the roads authorizing a special tariff rate of one dollar per railroad, such as was allowed in the case of Queen Marie of Roumania recently and on some previous cases.

The resolution adopted referred to Captain Lindbergh as having "brought honor to his country and fame to himself" and having "contributed greatly to the means of transportation in the air."

#### Secretary Hoover Finds Railway Service in Flood Area Near Normal

Herbert Hoover, on May 31, issued the following statement regarding railway service in the flood territory:

"Our reports today show that all of the important railway systems operating

in the flood territory are now able to handle the whole of their through traffics—that is the Missouri Pacific, Illinois Central, Gulf Coast, Texas Pacific and Rock Island—and their trains are running on time.

"The Missouri Pacific System by putting in service their second bridge at Little Rock has entirely restored that connection. Its service is also fully in action southward through Monroe to Alexandria and by detour to New Orleans; its Texas lines have not been interfered with.

"The Illinois Central has restored its line from Vicksburg to Monroe and thus to Shreveport and its line into Greenville will be restored at once.

"The Southern Pacific has maintained its through lines. All important services are now rehabilitated or maintained by detours except parts of local lines in the actual flood area. These local lines are being restored as fast as waters recede and are practically complete in Arkansas, Missouri and northward. Shippers and travellers can restore their normal business relations."

### C. N. R. Rejects Conciliation Award

The Canadian Department of Labor at Ottawa has received a communication from the Canadian National rejecting the majority award of the Board of Conciliation named to settle the wage dispute between the company and 15,000 clerks and freight handlers, but accepting the minority award as a basis for further discussion.

The majority award, signed by W. J. Donovan, of Winnipeg, and Howard S. Ross, of Montreal, called for an increase in wages of four cents an hour to the hourly-rated employees and an equivalent increase to the monthly-rated employees, also for half a cent per hour to be set aside for equalizing wages as between the various regions into which the Canadian National system is divided.

The minority award, signed by Peter White, of Toronto, called for an increase of two cents per hour to the hourly-rated employees and an equivalent increase to the monthly-rated employees, also half a cent per hour for the purpose of equalizing wages as between the various regions of the National system.

The Canadian National in their communication to the Department of Labor, has, it is understood, stated that some adjustment of wages is necessary, but that so many factors enter into the general wage situation that the company is unwilling to accept a final settlement on the basis of the majority award.

### I. C. C. Assigned Car Rule Sustained

The Supreme Court of the United States, in a decision rendered on May 31, upheld the Interstate Commerce Commission's "assigned car" order, which was to have become effective on March 1, 1925, which prohibited railroads in time of car shortage from placing for loading at coal mines more than each mine's ratable share of the car supply available in each dis-

trict, unless authorized by emergency order of the commission, and required that cars assigned for railroad fuel service as well as private cars must be counted with other cars. The commission's order was contested by a number of railroads, coal operators and private car owners and the cases reached the Supreme Court on appeal from the district court for the eastern district of Pennsylvania, which had enjoined the commission's order. The decision was by Justice Brandeis. Justice McReynolds dissented.

The court said that there was clearly no constitutional obstacle to the rule prescribed by the commission and that it was designed to prevent unjust discrimination in the use of transportation facilities and improve service, by preventing any mine, including one operated by a railroad, from obtaining, at a particular time, more than its ratable share of the aggregate available coal transportation facilities.

"The rule does not divert the surplus of cars owned by one shipper to use by another," Justice Brandeis said in his opinion. "It merely puts a restriction upon the use of the private car by limiting the number of so-called assigned cars which may be placed at a particular mine at a particular time. The owner may use the surplus cars elsewhere. Or he may lease the surplus cars to the carrier or to another shipper. The operation of the rule upon assigned railroad fuel cars is precisely similar."

Taking up the objection raised that the order was a taking of property without due process of law, Justice Brandeis said that Congress could exclude private cars from interstate railroads and that it might prescribe conditions on which alone they might be used; limiting their use did not involve regulation of the coal-mining industry. Congress may prescribe how carrier-owned cars should be used, he said, and the regulation merely limits the use of certain interstate transportation facilities. He added that the commission had acted in the light of a rich experience and that it had learned that existing practices resulted in discrimination and unsatisfactory service.

### The Canadian Roads in April

Canadian National gross earnings for April this year showed an increase of \$1,497,833, or 7.39 per cent and net earnings an increase of \$75,219 or 2.75 per cent.

Operating expenses during the month of April, 1927, increased by \$1,422,614, or 8.11 per cent, and the operating ratio for the month was 87.09 per cent as against 86.51 in April, 1926.

The operating expenses for the period relatively reflect increases in rates of pay and greater activity in maintenance of way work, the latter being due to climatic and other conditions generally favoring an earlier start on the season's work in certain localities. There is an improvement in net earnings notwithstanding the fact that the month of April, 1926, and the four months period of last year represent the best previous system performance.

For the first four months of the present calendar year, gross earnings of the Canadian National are shown to be

\$84,289,166, an increase of \$4,963,189, or 6.26 per cent over the earnings for the corresponding period of 1926. During the period operating expenses increased by \$4,509,648 or 6.52 per cent over those for the first four months of 1926.

The summary of earnings and expenses follows:

| April—       | 1927         | 1926         | Inc.        | P. C. |
|--------------|--------------|--------------|-------------|-------|
| Gross        | \$21,776,705 | \$20,278,871 | \$1,497,833 | 7.39  |
| Op. ex.      | 18,965,871   | 17,543,257   | 1,422,614   | 8.11  |
| Net          | 2,810,833    | 2,735,613    | 75,219      | 2.75  |
| Four months— |              |              |             |       |
| Gross        | \$84,289,166 | \$79,325,976 | \$4,963,180 | 6.26  |
| Op. ex.      | 73,634,701   | 69,125,052   | 4,509,648   | 6.52  |
| Net          | 10,654,464   | 10,200,923   | 453,540     | 4.45  |

Canadian Pacific gross earnings for April this year totaled \$15,121,289, as compared with \$13,856,101 in the same month last year, an increase of \$1,265,187.

Operating expenses amounted to \$12,867,701, as against \$11,706,461 in April of last year, an increase of \$1,161,239. Net for the month, \$2,253,588, was the highest for any April since 1921 and compared with \$2,149,639 in April of last year, being an increase of \$103,948.

For the four-month period ended April 30, gross earnings are shown at \$58,357,298, as compared with \$54,201,059 in the same months of last year, an increase of \$4,156,238. Operating expenses amounted to \$49,641,082, as against \$45,520,352, an increase of \$4,120,729. Net for the four-month period at \$8,716,216 was the highest for any like period since 1917 and compared with \$8,680,706 in the same period of last year, being an increase of \$35,509.

Gross earnings, operating expenses and net for the month of April and for the first four months ended with April are shown, with comparisons, in the following table:

| April—                   | 1927         | 1926         | Inc.        |
|--------------------------|--------------|--------------|-------------|
| Gross                    | \$15,121,289 | \$13,856,101 | \$1,265,187 |
| Op. exp.                 | 12,867,701   | 11,706,461   | 1,161,239   |
| Net                      | \$2,253,588  | \$2,149,639  | \$103,948   |
| Four months ending Apr.— |              |              |             |
| Gross                    | \$58,357,298 | \$54,201,059 | \$4,156,238 |
| Op. exp.                 | 49,641,082   | 45,520,352   | 4,120,729   |
| Net                      | \$8,716,216  | \$8,680,706  | \$35,509    |

### Harriman Award Plan

The Committee of Award of the American Museum of Safety has changed the plan of determining the E. H. Harriman Memorial Medal Awards for the year 1926, according to an announcement by Arthur Williams, chairman of the committee and president of the organization. Instead of 1,000,000 passenger locomotive miles the committee will use 100,000,000 passenger miles as the basis of awards. The weight formerly given to casualties to "all other persons" has been reduced by one half.

The gold medal will be offered as first prize for Class I railways having a total locomotive mileage of 10,000,000 or over per year, the silver medal will be offered as first prize for Class I railways having a total locomotive mileage of more than 1,000,000 but less than 10,000,000 per year and the bronze medal will be offered as first prize for Class I railways having a total locomotive mileage of less than 1,000,000 per year. This year the railroads will be ranked by individual lines as they file separate reports with the Interstate



Commerce Commission. Besides the three medals it has been left to the discretion of the Committee of Award to select one or more Class I railways for honorable mention.

In considering casualties, accidents to trespassers and suicides will be omitted, though persons carried under contract and employees not on duty will be listed as employees. The weighting applied to all averages, as between persons killed and persons injured, will be on the basis of 50 points for each death and one point for each injury. Ratings for deaths and injuries will be on the basis of: 100,000,000 passenger miles for train accidents, 1,000,000 passengers carried for train service accidents, 1,000,000 locomotive miles for train and train service accidents, 1,000,000 man-hours for all employees except those in train and engine service who are involved in non-train accidents, 500,000 locomotive miles for all other persons in train, train service and non-train accidents. The average developed under each of these heads will be added together to produce the final rating for each railway.

As in preceding years the official summaries and records of the Interstate Commerce Commission will be used by the committee in determining the prizes. The committee is empowered to take into consideration other safety and welfare work which tends to prevent loss of life in accidents and promotes the safety cause in general. Factors, such as density of traffic, which have a bearing on the relative accomplishment of any railway or railways in the safety field will also be given due weight by the committee.

The membership of the Committee of Award is as follows: Arthur Williams, chairman; John J. Esch, chairman of the Interstate Commerce Commission; R. H. Aishton, president of the American Railway Association; Samuel O. Dunn, editor of the *Railway Age*; F. D. Underwood, former president of the Erie, acting as advisor to the committee on behalf of Mrs. E. H. Harriman.

#### New Manager of Public Relations for Car Service Division

The board of directors of the American Railway Association, following the regular spring meeting in Atlantic City on May 26, announced approval of the appointment of Harry G. Taylor, chairman of the Nebraska State Railway Commission, as manager of public relations of the Car Service Division, American Railway Association, effective July 1. Mr. Taylor will succeed Donald D. Conn, who for the past five years has served in that capacity.

Mr. Taylor is chairman of the Central States Shippers' Regional Advisory Board, which includes the states of Nebraska, Wyoming, Colorado, Utah, Idaho and part of Oregon, in addition to being chairman of the Nebraska commission, of which he has been a member since 1913. Born and raised on a farm and having all his business connections, until he became a member of the Nebraska commission, with farmers, Mr. Taylor has made a study of the agricultural situation for years and its relationship to transportation and is recognized as an authority on that subject. He

was a member of the Nebraska state legislature in 1911-1912 and served as president of the National Association of Railway & Utility Commissioners in 1923 and 1924. He was educated at Kansas Wesleyan at Salina, Kan., and the United Brethren College at York, Neb.

Donald D. Conn has resigned, effective July 1, to become director of the California



H. G. Taylor

Vineyardists' Association, with headquarters in Fresno and San Francisco, and will devote attention to the organization of the California grape industry. The California Vineyardists' Association is made up of approximately 30,000 growers.

In the five years in which he has been manager of public relations of the Car Service Division, Mr. Conn has devoted practically his entire time to the organization and development of the various Shippers' Regional Advisory Boards, which have now been formed in all sections of



D. D. Conn

the country and which have, to a large degree, been responsible for bringing about a better understanding between shippers and the rail carriers as to their mutual problems than has ever existed before. These boards now have a total membership in excess of 15,000 representatives of practically every industry. Prior to his connection with the car service division, Mr. Conn was in 1920-1921 chief of the transportation division of the joint Congressional commission of agricultural inquiry,

of which Representative Sidney Anderson of Minnesota was chairman. He has had extensive experience as a representative of the agricultural interests of the Northwest on transportation problems and was chairman of the Northwestern governors' coal commission at the time of the strike of bituminous miners and railway shopmen in 1922.

#### American Railway Development Association

The American Railway Development Association will hold its nineteenth annual meeting at the Hotel Statler, Detroit, Mich., on June 8 to 10. On Wednesday morning E. E. Kramp, industrial secretary of the Detroit Chamber of Commerce, will speak on "The Rising Tide in Industrial Development" and Price Green, commissioner of natural resources of the Canadian National, will address the meeting on "The progress of the Development of Natural Resources on the Canadian National Railways." The election of officers will also take place at this session.

In the afternoon, Walter L. Dunham, vice-president of the First National Bank of Detroit, Mich., will address the Industrial section on "Banking Institutions and Their Relation to Community Industrial Development," Louis J. Flint, vice-president of the Detroit Citizens' Committee will speak on "The American Plan," and A. L. Moorshead, industrial engineer of the Erie, will speak on "Real Estate Operators and Industrial Development." The Agricultural section will be addressed by J. T. Horner, professor of economics of the Michigan State College, on the subject "Marketing—Its Place and Scope in Economics." In addition, Earle G. Reed, agricultural agent of the New York Central, will speak on "How the Railroad Agricultural Departments May Aid in Livestock Loss Prevention," and H. C. Rather, assistant director of extension in charge of corn borer control of Michigan State College, will address the section on "The Problem of the Corn Borer—How Can It Be Solved?"

At the general meeting on the second morning the progress in public relations activities on the eastern railways will be discussed by R. S. Binkerd, vice-chairman of the Eastern Railway Executives' Association. C. E. Arney, western industrial and immigration agent of the Northern Pacific, will speak on "Tax Economy Possibilities." John D. Willard, director of continuing education of Michigan State College, will talk on "The Value of Continuing Education in Agriculture Development," and Norman S. Rankin, editor of *Agricultural and Industrial Progress* in Canada, of the department of colonization and development of the Canadian Pacific, will speak on "Immigration, Colonization and Development in Canada."

At the Industrial section session in the afternoon, John J. Danhof, Jr., assistant general attorney of the Michigan Central, will speak on "Terminal Switching Charges and Industrial Sidetrack Contracts," John Beukema, secretary of the Greater Muskegon Chamber of Commerce, will speak on "The Requisites of a Cam-

campaign for Industrial Development," Myles Bradley, manager of the publicity department of the General Motors Corporation, will speak on "Industrial Public Relations" and Franklin Edwards of the Judson Bradway Company, will speak on "Industrial Surveys—Real Estate and Industrial Development." At the Agricultural section meeting, on the same afternoon, addresses will be made by Luther Fuller, general agricultural agent of the Chicago & Eastern Illinois on "Advertising as an Aid to the Farmer in Selling His Products," C. A. Radford, publicity manager of the Cleveland, Cincinnati, Chicago & St. Louis, on "The Country Press as a Means of Public Relations Contacts," E. S. Center, Jr., general agricultural agent of the Atlanta & West Point, on "The Value of a House Organ in Development Programs," G. F. Wallace, marketing agent of the Missouri Pacific, on "The Methods for Expanding the Markets for Agricultural Produce," and W. H. Lapp, extension director of the Live Poultry Transit Company, on "Poultry Disease, Sanitation and Production."

At the general session on the morning of the third day, the subjects presented will include "Real Estate and Industrial Development" by Guy W. Ellis, president of the Guy W. Ellis Realty Company; "Taxation and Its Effect on Industrial and Agricultural Development" by Dr. L. D. Upson, director of the Detroit Board of Governmental Research; "Conservation—The Problem of the Lake States," by L. J. Young, director of the Michigan Department of Conservation; "The Progress in Public Relations Activities on the Western Lines," by C. D. Morris, vice-chairman of the Western Railways' Committee on Public Relations; and "Cold Storage—Its Relation to Agricultural and Industrial Development" by L. B. Kilbourne.

### New Levee Break Floods More Lines in Louisiana

With the breaking of the Atchafalaya river levee at McCrea, La., 16 miles north of the Texas & Pacific crossing at Melville, the last hope of saving the "Sugar Bowl" territory faded out. Pointe Coupee parish is already under water, as are parts of West Baton Rouge and Iberville parishes and the flood is sweeping everything before it in its rush to the Gulf. Railway lines affected in the three doomed parishes include the Texas & Pacific and Gulf Coast Lines' main lines, which are already inundated west of the river, and the Southern Pacific branch line to Baton Rouge.

Gulf Coast Lines trains are still operating out of New Orleans over the Southern Pacific main line via Opelousas, but, due to high water on the S. P. branch north of Opelousas, it was necessary for the T. & P. to cease operation of its detour service. Trains are now operated on this line only as far east as Bunkie, La. For a time, service was also maintained over the main line from New Orleans to Red Cross, La., on the east bank of the Atchafalaya river, across from Melville, but water from the McCrea break has now flooded this portion of the line and rendered operation impossible.

At last reports, the Southern Pacific main line was still untouched, but the water was rising rapidly in Grand Lake and the present immunity of this line is likely to be of short duration.

In contrast to the gloomy outlook in southern Louisiana, a material improvement in flood conditions has taken place in northern Louisiana. Intensive work is being done to get the Vicksburg, Shreveport & Pacific main line, from Delta Point, La., to Monroe, 75 miles, back in service. The water is falling rapidly in this district. The Missouri Pacific is also engaged in restoring its branch lines to serviceable condition as the water leaves them.

The situation in southeastern Arkansas is very much improved.

On the Missouri Pacific passenger and freight trains are being operated regularly and on schedule. Main lines to the west and south and Texas, with one small detour beyond M. P. lines to New Orleans, are open.

Large construction forces are at work on the Yazoo & Mississippi Valley in Mississippi. The main line between Greenville and Memphis is expected to be in operation by June 7. The most recent report on conditions in this territory is as follows: Cleveland to Leland, 26 miles, clear of water; Leland to Rolling Fork, 37 miles, 26 miles clear and 11 miles under water; Rolling Fork to the Yazoo River bridge, 33 miles, 11 miles clear and 22 miles under water. The deepest water on any of this track is now 23 in. Hannah to Greenville, 20 miles, all under water, which is 72 in. deep in one place; Greenville to Riverside Junction, 40 miles, 13 miles clear, 27 miles under water, deepest water 49 in. On the Silver Creek district, 41 miles, 11 miles are clear and 30 miles under water; Yerger district, 15 miles, all under water; Helm district, 12 miles, 2 miles clear, 10 miles under water. A summary of the Greenville division, comprising 458 miles, shows 320 miles clear and 138 miles still submerged. At the highest flood stage, three weeks ago, more than 275 miles of this division were under water.

A general summary of the situation on both sides of the river indicates that 1,311 miles of track were flooded in Arkansas, of which 15 per cent was washed out; 439 miles of track in Mississippi were inundated of which 250 miles, or more than half, were washed out. In Louisiana, 955 miles were flooded and more track is going under water daily. No estimate of the amount of track washed out will be available for some weeks, until the flood in this stage subsides.

The effect of the flood on the operating revenues of the railways in the submerged areas is shown by the Missouri Pacific's report for April. In the statement issued by President L. W. Baldwin, the total operating revenues for the month are given as "\$8,812,107 as compared with \$10,735,535 for the same month in 1926. This decrease is largely due to the floods and also to a misunderstanding by the public concerning the ability of the railroad to handle business as usual into southwest territory because of the loss of the Baring Cross bridge at Little Rock. The loss of

this bridge does not in any way affect the movement of trains through the Little Rock gateway as the company has another bridge spanning the Arkansas river at that point, which was immediately placed in service for both passenger and freight trains. It has always been used for the movement of freight trains. The net railway operating income is a deficit of only \$155,088 despite the heavy expenditures made necessary by the flood damage to tracks and bridges, and the temporary reduction in gross revenue. Under the circumstances, this is a remarkably good showing."

### Meeting of the Air Brake Appliance Association

J. H. Ainsworth, A. M. Byers Company, Pittsburgh, Pa., was elected president, and Charles R. Busch, Buffalo Brake Beam Company, New York, was elected secretary-treasurer of the Air Brake Appliance Association at its annual meeting held in connection with the convention of the Air Brake Association at the Mayflower Hotel, Washington, D. C., May 24-27. A list of the exhibitors at this meeting, their exhibits and the names of their representatives follows:

American Brake Shoe & Foundry Company, 30 Church street, New York.—Brake shoes. Represented by A. H. Elliot, J. T. Talbot, M. N. Trainer, R. E. Holt and G. E. Anne.

American Hammered Piston Ring Company, Bush and Hamburg streets, Baltimore, Md.—Piston rings (with hammer machine). Represented by John A. Worthington, John H. Meyers and Morton J. Cromwell.

American Steel Foundries, 410 No. Michigan avenue, Chicago, Ill.—Dalman truck, Simplex clasp brakes, Ajax brake beams and cast steel brake heads. Represented by A. H. Peycke and W. C. Walch.

Ashten Valve Company, 161 First street, Cambridge C., Boston, Mass.—Quadruplex air brake gages, duplex air brake gages, dead weight pressure tester, back pressure gages, protected dial gages and safety valves. Represented by H. O. Fettinger and J. F. Gettrus.

Barco Manufacturing Company, 1801 Winnemac avenue, Chicago, Ill.—Barco 3V engine tender connections, Barco joints for locomotive piping and balanced and lubricated plug valves. Represented by Arthur S. Lewis and Wm. J. Behlke, Jr., Bradford Corporation, 25 West 43rd street, New York.—Type F-5-B draft gear, Bradford R-50 rocker gear and improved type chambers throttle valve.

Represented by Lewis B. Rhodes. Brake Equipment & Supply Company, 2324 South Canal street, Chicago, Ill.—Air brake repair parts. Represented by B. Pratt, John F. Pratt, J. McClintock, L. E. Hassman, Jas. E. Stewart and M. M. Farmer.

Buffalo Brake Beam Company, 32 Nassau street, New York.—Self-locking brake shoe keys, self-locking brake pins, self-locking draft key retainers and brake beam supports. Represented by C. R. Busch and J. L. Logan.

Byers, A. M. Company, Union Bank Bldg., Pittsburgh, Pa.—Genuine wrought iron pipe. Represented by J. H. Ainsworth, C. A. Croft, C. W. Damberg and F. W. Stubbs.

Carborundum Company, Niagara Falls, N. Y.—Carborundum stones for slide valves, grinding wheels, Alomite cloth, valve compound and lapping powders. Represented by W. J. Griffith and H. L. Henszey.

Chicago Railway Equipment Company, 1928 W. Forty-sixth street, Chicago, Ill.—Creco brake beams, Creco brake beam supports, Creco brake beam safety guards and bottom rod guards. Represented by E. G. Russe.

Corley-DeWolfe Company, 323 Pine street, Elizabeth, N. J.—Ground joint pipe unions. Represented by Ralph A. Corley.

Crane Company, 836 S. Michigan avenue, Chicago.—Railroad and power material. Represented by J. C. Cole and J. Jordan.

Davis Brake Beam Company, Johnstown, Pa.—Brake beams, brake beam supports, safety arms, journal box lids and metal stampings. Represented by W. R. Kennedy and C. K. Stillwagon.

Dearborn Chemical Company, 310 S. Michigan avenue, Chicago, Ill.—No-ox-id Rust preventive. Represented by J. A. Crenner, M. J. O'Connor and C. A. Remsen.

Detroit Lubricator Company, Trumbull avenue and Grand Trunk Railway, Detroit, Mich.—Force



feed oiler, flanger oiler and hydrostatic lubricators. Represented by A. G. Machesney and S. A. Witt.

Dewitt Air Brake Lapping Machine Company, 54 W. Lake street, Chicago, Ill.—Air brake lapping machine. Represented by Louis G. Groessl and C. Dewitt.

Dixon, Joseph, Crucible Company, Jersey City, N. J.—Dixons graphite brake cylinder lubricant, triple valve graphite, graphite pipe, joint compound and other graphite products used largely by the railroads. Represented by W. A. Houston and J. M. Willis.

Edna Brass Manufacturing Company, 528 Reading road, Cincinnati, Ohio.—Mechanical lubricators, water columns, water gage and fittings and air manifold. Represented by E. O. Corey, F. Wilcoxon, Wm. Beck and E. F. O'Connor.

Ford, J. B., Company, Wyandotte, Mich.—Wyandotte cleaning compounds for removal of grease, oil, lubricating compounds and paint. Represented by John T. Woolsey and George J. Lawrence.

Poster-Johnson Reamer Company, Elkhart, Ind.—Hand expansion reamers and reamer sharpener. Represented by F. M. Enos and L. Groessl.

Garlock Packing Company, Palmyra, N. Y.—Mechanical packings. Represented by L. P. Duggan.

General Railway Signal Company, Rochester, N. Y.—Automatic train control. Represented by H. C. Ware and S. Mosher.

George Manufacturing Company, Philadelphia, Pa.—Automatic drain valves, automatic drain and relief valves and automatic cylinder cocks. Represented by R. H. George.

Gold Car Heating & Lighting Company, 220 Thirty-sixth street, Brooklyn, N. Y.—Car heating devices. Represented by E. B. Wilson, Tom Moore and J. O. Brumbaugh.

Goodall Rubber Company, Eighth & Locust streets, Philadelphia, Pa.—Lip air hose gasket (patented). Represented by George B. Wood.

Graham-White-Sander Corporation, Box 376, Roanoke, Va.—Graham-White sanders and Graham-White sand spreaders. Represented by W. L. Ranson and W. H. White.

Griffin Wheel Company, Chicago, Ill.—Literature. Represented by F. K. Vial, E. C. Edwards and George Acker.

Gustin-Bacon Manufacturing Company, 1416 W. 11th street, Kansas City, Mo.—Railroad supplies. Represented by F. L. Bacon, Fred Speer, J. S. Hearons, G. R. Miller, D. P. Morgan and Clark Diller.

Illinois Railway Equipment Company, Railway Exchange, Chicago.—Wright pipe clamps, Azee retainer valve anchor and positive brake pin lock. Represented by E. Payson Smith and Brame S. Rockwell.

Jenkins Brothers, 80 White street, New York.—Car heating gaskets, rubber packings and valves. Represented by C. B. Yardley.

Johns-Manville Corporation, Forty-first street and Madison avenue, New York.—Packings and insulations. Represented by Fred Horne, W. R. Bush, A. F. Eichhorn, R. J. Offutt and Geo. Christensen.

Leslie Company, Lyndhurst, N. J.—Steam heat pressure regulators, reducing valves and self-cleaning strainers. Represented by S. I. Leslie and J. J. Cizek.

Manning-Maxwell & Moore, Inc., 100 E. Forty-second street, New York.—Ashcroft cut-off control gage and Hancock valves. Represented by J. C. Blanton and C. D. Allen.

Metallo Gasket Company, New Brunswick, N. J.—Metallic-asbestos gasket. Represented by Zeno Schultes.

Milar, Clinch & Co., 208 S. LaSalle street, Chicago, Ill.—Wolfe bushing grinder. Represented by C. H. Broo.

Miner, W. H., Inc., 667 The Rookery, Chicago, Ill.—Miner ideal safety hand brakes for passenger and freight car equipment, draft gears types A-79-X A-2-X and A-69-XX and rolling rocker side bearings. Represented by Bradley S. Johnson and John H. Link.

Mudge & Co., Railway Exchange, Chicago, Ill.—Brake pipe clamp and angle cock holder. Represented by Arthur R. Fletcher.

Nathan Manufacturing Company, 250 Park avenue, New York.—Mechanical lubricators and low water alarm. Represented by Otto Best, F. C. Davern, R. H. Jenkins, Frank Marsh and W. G. Lockwood.

National Malleable & Steel Castings Company, 10600 Quincey avenue, Cleveland, Ohio.—Power hand brake mechanism and non-binding ratchet. Represented by George R. Farrell and David Robinson.

National Tube Company, Pittsburgh, Pa.—National scale-free pipe, National copper bearing steel pipe, and National-Shelby seamless pipe for locomotives. Represented by H. Gourdain, T. W. Thorne, I. M. Denney, H. R. Reddington, F. N. Speller, H. R. Mazurie, J. W. Kelley, P. J. Conrath, N. C. Nicol and A. S. Robinson.

New York Air Brake Company, 420 Lexington avenue, New York.—Core set up for Universal control valve, new fit steam piston on rod, M.3 feed valve and centrifugal air pump strainer. Represented by E. F. Wentworth, C. B. Miles, J. B. Brown, B. Haynes, L. W. Sawyer and H. A. Flynn.

New York & New Jersey Lubricant Company, 292 Madison avenue, New York.—Non fluid oil, brake cylinder lubricant and N. F. O. triple valve lubricant. Represented by Jos. H. Bennis.

Oakite Products, Inc., 22 Thames street, New York, N. Y.—Blue print and technical data covering the laundering of locomotive air pumps and general locomotive cleaning works with Oakite railroad cleaner, and booklets on industrial cleaning. Represented by J. A. Carter, Jr. and A. P. Hanton.

Ohio Injector Company, 53 Jackson Blvd., Chicago, Ill.—Low water alarm, automatic flange oilers, injectors and lubricators. Represented by Frank W. Edwards and C. G. Sauerberg.

Okadee Company, 14 E. Jackson Blvd., Chicago, Ill.—Front end hinge, automatic cylinder cock, tank hose coupler and blow-off cock. Represented by G. M. Monroe, W. H. Heckman and A. G. Hollinghead.

Paxton-Mitchell Company, Omaha, Neb.—Air pump packing model and segments. Represented by Jas. A. Murrian and L. M. McConnell.

Piston Ring Company, Muskegon, Mich.—Piston and packing rings. Represented by E. W. Cadman.

Reading Iron Company, Reading, Pa.—Genuine wrought iron pipe. Represented by Donald Charlton, C. T. Ressler, J. K. Aimer and H. L. Shepard.

Richmond Piston Ring Company, Richmond, Ind.—Electrically hammered piston rings. Represented by Harry L. Burrhus.

Robinson Automatic Connector Company, 415 Lexington avenue, New York.—Robinson automatic connectors for air and steam hose. Represented by Joseph Robinson.

Rogers Reamer Company, 514 Empire Building, Pittsburgh, Pa.—Triple valve grinders. Represented by L. J. Nelson.

Schaefer Equipment Company, Pittsburgh, Pa.—Brake beam hangers, brake levers, brake rod jaws and truck lever connections. Represented by H. G. Doran and E. J. Searles.

Sellers, Wm. & Co., Inc., 1600 Hamilton street, Philadelphia, Pa.—Exhaust feedwater heater injector, Sellers non-lifting injector, coal sprinklers, feedwater strainers and drifting valves. Represented by John D. McClintock and James R. New.

Sheafe Engineering Company, 7356 Woodlawn avenue, Chicago, Ill.—Bronze air hose coupling, air valves and air valve cages. Represented by Ralph Sheafe.

Sheldon Machine Company, 3253-55 Cottage Grove avenue, Chicago, Ill.—Sheldon grinder for triple-distributing valve and feed valve cylinder bushings, holding fixture for triple and distributing valves, feed valve piston spreader, Sheldon locomotive grinder and general purpose grinder. Represented by H. J. Duernberger and A. J. Cote.

Special Bolt Machinery Corporation, 50 Church street, New York.—Semi-automatic valve finishing machines. Represented by Walter H. Foster and H. L. Kenah.

Swanson Company, 630 Louisiana avenue, Washington, D. C.—Gage holder. Represented by C. H. Kadie and R. R. Gainer.

Underwood, H. B., Corp., 1025 Hamilton street, Philadelphia, Pa.—Compressor boring bar. Represented by F. H. Schonberger.

Union Railway Equipment Company, 332 S. Michigan avenue, Chicago, Ill.—Ureco high power hand brake. Represented by James A. Galligan and George E. Coffey.

Union Switch & Signal Company, Swissvale, Pa.—Motion pictures of train control equipment as applied to various roads, also transparencies of typical motive power. Represented by K. E. Kellenberger and L. L. Buck.

United States Graphite Company, Saginaw, Mich.—Triple valve graphite, pipe joint compound and brake cylinder grease. Represented by W. R. Pfisterer and W. F. Ogilvie.

United States Metallic Packing Company, 429 N. Thirteenth street, Philadelphia, Pa.—King air pump packing, piston rod and valve stem packing and sander. Represented by John C. Weedon.

Universal Draft Gear Attachment Company, 80 E. Jackson Blvd., Chicago, Ill.—Hand brakes to suit requirements on any type of car. Represented by C. J. Nash, P. B. Camp, H. I. Wrigley, J. M. Hall and W. G. Krauser.

Vapor Car Heating Company, Inc., 80 E. Jackson Blvd., Chicago, Ill.—Double automatic thermostatic control of vapor heating, pressure reducing valve, end train pipe valve, flexible metallic conduit, and locomotive stop valve. Represented by Lewis B. Rhodes.

Viloco Railway Equipment Company, 14 E. Jackson Blvd., Chicago, Ill.—Automatic sander, automatic bell ringer and automatic whistles and vacuum type bell ringer. Represented by G. M. Monroe, W. H. Heckman and A. G. Hollinghead.

Walworth Company, 51 E. Forty-second street, New York.—Kewanee unions and union specialties, brass globe and angle valves and malleable iron air brake fittings. Represented by E. S. Rawson, Jr. and P. B. Miller.

Westinghouse Air Brake Company, Wilmerding, Pa.—M. type feed valve, centrifugal air cleaner, A. R. A. gages for hose coupling, improved packing rings for air compressors, friction draft gear, air valves and other air brake parts. Represented by E. G. Descoe, R. P. Ives, E. A. Maylock, E. R. Fitch, H. H. Burns, F. B. Johnson, J. Hume, H. A. Wahlert, J. S. V. Fralich, F. B. Farmer, T. G. Myles, F. W. Ainsworth, R. J. Knapp, J. R. Holtom,

L. M. Carlton, V. Villette, R. K. Whittlesey, F. H. Parke, A. L. Berghane, R. I. Cunningham, J. B. Wright, C. C. Farmer, J. C. McCune, R. E. Miller, H. J. Robinson, Donald Brown and T. H. Thomas.

## Meetings and Conventions

The following list gives names of secretaries, dates of next or regular meetings and places of meetings.

AIR BRAKE ASSOCIATION.—T. L. Burton, 165 Broadway, New York City. Exhibit by Air Brake Appliance Association.

AIR BRAKE APPLIANCE ASSOCIATION.—J. H. Ainsworth, A. M. Byers, Co., 410 Union Bank Bldg., Pittsburgh, Pa. Meets with Air Brake Association.

AMERICAN ASSOCIATION OF FREIGHT TRAFFIC OFFICERS.—J. D. Gowin, 112 W. Adams St., Chicago.

AMERICAN ASSOCIATION OF GENERAL BAGGAGE AGENTS.—E. L. Duncan, 332 S. Michigan Ave., Chicago. Next meeting, June 21-23, 1927, Mackinac Island, Mich.

AMERICAN ASSOCIATION OF PASSENGER TRAFFIC OFFICERS.—W. C. Hope, C. R. R. of N. J., 143 Liberty St., New York. Next annual meeting, November, 1927, Havana, Cuba.

AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—J. Rothschild, Room 400, Union Station, St. Louis, Mo. Annual convention, June 21-24, 1927, San Francisco.

AMERICAN ASSOCIATION OF SUPERINTENDENTS OF DINING CARS.—C. E. Bell, Seaboard Air Line, Washington, D. C. Next meeting, October, 1927, Chicago.

AMERICAN ELECTRIC RAILWAY ASSOCIATION.—J. W. Welsh, 292 Madison Ave., New York. Annual convention, Oct. 3-7, 1927, Cleveland Public Auditorium, Cleveland, Ohio.

AMERICAN RAILROAD MASTER TINNERS', COPPER-SMITHS' AND PIPE FITTERS' ASSOCIATION.—C. Borchardt, 202 North Hamlin Ave., Chicago, Ill.

AMERICAN RAILWAY ASSOCIATION.—H. J. Forster, 30 Vesey St., New York, N. Y. Division I.—Operating.—J. C. Caviaton, 30 Vesey St., New York.

Freight Station Section (including former activities of American Association of Freight Agents)—R. O. Wells, Freight Agent, Illinois Central Railroad, Chicago, Ill. Medical and Surgical Section.—J. C. Caviaton, 30 Vesey St., N. Y.

Protective Section (including former activities of the American Railway Chief Special Agents and Chiefs of Police Association)—J. C. Caviaton, 30 Vesey St., New York. Next meeting, June 21-23, Hotel St. Francis, San Francisco, Calif.

Safety Section.—J. C. Caviaton, 30 Vesey St., New York.

Telegraph and Telephone Section including former activities of the Association of Railroad Telegraph Superintendents.—W. A. Fairbanks, 30 Vesey St., New York. Next meeting, Oct. 4-6, The Willard, Washington, D. C.

Division II.—Transportation (including former activities of the Association of Transportation and Car Accounting Officers).—G. W. Covert, 431 South Dearborn St., Chicago.

Division III.—Traffic. J. Gottschalk, 143 Liberty St., New York.

Division IV.—Engineering. E. H. Fritch, 431 South Dearborn St., Chicago, Ill. Annual meeting, March 6-8, 1928, Chicago. Exhibit by National Railway Appliances Association.

Construction and Maintenance Section.—G. H. Fritch.

Electrical Section.—E. H. Fritch. Signal Section (including former activities of the Railway Signal Association).—H. S. Balliet, 30 Vesey St., New York. Next meeting, Sept. 13-15, 1927, Mount Royal Hotel, Montreal, Que.

Division V.—Mechanical (including former activities of the Master Car Builders' Association and the American Railway Master Mechanics' Association).—V. R. Hawthorne, 431 South Dearborn St., Chicago, Ill. Annual Meeting, June 7-10, 1927, Hotel Windsor, Montreal, Que. No exhibits at this meeting.

Equipment Painting Section (including former activities of the Master Car and Locomotive Painters' Association).—V. R. Hawthorne, 431 South Dearborn St., Chicago. Annual convention, Sept. 13-15, 1927, Hotel Kentucky, Louisville, Ky.

Division VI.—Purchases and Stores (including former activities of the Railway Storekeepers' Association).—W. J. Farrell, 30 Vesey St., New York, N. Y.

Division VII.—Freight Claims (including former activities of the Freight Claim Association).—Lewis Pilcher, 431 South Dearborn St., Chicago, Ill. Annual meeting, June 14-17, Quebec, Canada.



Car Service Division.—C. A. Buch, 17th and H Sta. N. W., Washington, D. C.

AMERICAN RAILROAD BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W. Ry., 319 N. Waller Ave., Chicago. Exhibit by Bridge and Building Supply Men's Association. Annual convention, October 18-20, 1927, Hotel Nicolet, Minneapolis, Minn.

AMERICAN RAILWAY DEVELOPMENT ASSOCIATION.—H. W. Byerly, General Immigration Agent, Northern Pacific, St. Paul, Minn. Annual meeting, June 8-10, 1927, Hotel Statler, Detroit, Mich.

AMERICAN RAILWAY ENGINEERING ASSOCIATION.—(Works in co-operation with the American Railroad Association Division IV.) E. H. Fritch, 431 South Dearborn St., Chicago. Annual meeting, March 6-8, 1928, Chicago. Exhibit by National Railway Appliances Association.

AMERICAN RAILWAY MAGAZINE EDITORS ASSOCIATION.—Margaret T. Stevens, Baltimore & Ohio R. R., Baltimore, Md.

AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—G. G. Macina, C. M. & St. P. Ry., 11402 Calumet Ave., Chicago. Annual convention, Aug. 31, Sept. 1 and 2, 1927, Hotel Sherman, Chicago. Exhibit by Supply Association of the American Railway Tool Foremen's Association.

AMERICAN SHORT LINE RAILROAD ASSOCIATION.—T. F. Whittelsey, 1319-21 F St., N. W., Washington D. C.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., New York. Railroad Division, Marion B. Richardson, Associate Mechanical Editor, *Railway Age*, 30 Church St., New York.

AMERICAN WOOD PRESERVERS' ASSOCIATION.—E. J. Stocking, 111 West Washington St., Chicago. Next annual convention, Jan. 24-26, 1928, Montreal, Que.

ASSOCIATION OF RAILWAY CLAIM AGENTS.—H. D. Morris, District Claim Agent, Northern Pacific Ry., St. Paul, Minn.

ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Jos. A. Andreucetti, C. & N., Room 413, C. & N. W. Station, Chicago. Annual meeting, Oct. 25-28, 1927, Hotel Sherman, Chicago. Exhibit by Railway Electrical Supply Manufacturers' Association.

ASSOCIATION OF RAILWAY EXECUTIVES.—Stanley J. Strong, 17th and H. Sta., N. W., Washington, D. C.

BRIDGE AND BUILDING SUPPLY MEN'S ASSOCIATION.—D. A. Hultgren, secretary, Massey Concrete Products Co., 1328 McCormick Bldg., Chicago. Annual exhibit at convention of American Railway Bridge and Building Association.

CANADIAN RAILWAY CLUB.—C. R. Crook, 129 Charton St., Montreal, Que.

CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 626 North Pine Ave., Chicago. Regular meetings, 2nd Monday in month, except June, July and August, Great Northern Hotel, Chicago.

CAR FOREMEN'S ASSOCIATION OF LOS ANGELES.—J. W. Krause, 514 East Eighth St., Los Angeles, Calif. Regular meetings, second Friday of each month, 514 East Eighth St., Los Angeles.

CAR FOREMEN'S ASSOCIATION OF ST. LOUIS, MO.—R. E. Giger, 721 North 23rd St., East St. Louis, Ill. Meetings, first Tuesday in month at the American Hotel Annex, St. Louis.

CENTRAL RAILWAY CLUB.—Harry D. Vought, 26 Cortlandt St., New York. Regular meetings, 2nd Thursday each month, except June, July, August, Hotel Statler, Buffalo, N. Y.

CHIEF INTERCHANGE CAR INSPECTORS' AND CAR FOREMEN'S ASSOCIATION.—(See Railway Car Department Officers' Association.)

CINCINNATI RAILWAY CLUB.—D. E. Boyd, 811 Union Central Bldg., Cincinnati, Ohio. Meetings, 2nd Tuesday in February, May, September and November.

CLEVELAND RAILWAY CLUB.—F. L. Frericks, 14416 Alder Ave., Cleveland, Ohio. Meetings, first Monday each month, except July, August, September, Hotel Hollenden, Cleveland.

INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.—W. J. Mayer, Michigan Central R. R., Detroit, Mich. Next convention, August 16-18, 1927, Hotel Lafayette, Buffalo, N. Y. Exhibit by International Railroad Master Blacksmiths' Supply Men's Association.

INTERNATIONAL RAILROAD MASTER BLACKSMITHS' SUPPLY MEN'S ASSOCIATION.—W. R. Walsh, Ewald Iron Co., Louisville, Ky.

INTERNATIONAL RAILWAY FUEL ASSOCIATION.—L. G. Plant, 80 E. Jackson Blvd., Chicago. Annual convention, May 1928, Chicago. Exhibit by International Railway Supply Men's Association.

INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—Wm. Hall, 1061 W. Wabash Ave., Winona, Minn. Annual convention, September 6-9, 1927, Chicago.

INTERNATIONAL RAILWAY SUPPLY MEN'S ASSOCIATION.—W. J. Dickinson, 189 W. Madison St., Chicago. Meets with International Railway Fuel Association.

MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 26 Cortlandt St., New York.

NATIONAL ASSOCIATION OF RAILROAD TIE PRODUCERS.—E. A. Morse, vice-president, Potosi Tie & Lumber Co., St. Louis, Mo. Next annual convention, April 24-26, 1928, Arlington Hotel, Hot Springs, Ark.

NATIONAL ASSOCIATION OF RAILROAD AND UTILITIES COMMISSIONERS.—James B. Walker, 49 Lafayette St., New York. Annual meeting, October 17, 1927, Dallas, Tex.

NATIONAL RAILWAY APPLIANCE ASSOCIATION.—C. W. Kelly, 1014 South Michigan Ave., Chicago.

NATIONAL SAFETY COUNCIL.—Steam Railroad Section: J. E. Long, Superintendent Safety, D. & H., Albany, N. Y.

NEW ENGLAND RAILROAD CLUB.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meetings, 2nd Tuesday in month, excepting June, July, August and September, Copley Plaza Hotel, Boston, Mass.

NEW YORK RAILROAD CLUB.—Harry D. Vought, 26 Cortlandt St., New York. Regular meetings, 3rd Friday in month, except June, July and August.

PACIFIC RAILROAD CLUB.—W. S. Wollner, 64 Pine St., San Francisco, Cal. Regular meetings, 2nd Thursday in month, alternately in San Francisco and Oakland.

RAILROAD MOTOR TRANSPORT CONFERENCE.—R. H. Newcomb, 492 South Station, Boston, Mass.

RAILWAY ACCOUNTING OFFICERS ASSOCIATION.—E. R. Woodson, 1116 Woodward Building, Washington, D. C. Annual meeting, June 7-10, 1927, Cosmopolitan Hotel, Denver, Colo.

RAILWAY BUSINESS ASSOCIATION.—Frank W. Noxon, 1406 Packard Bldg., Philadelphia, Pa. Annual meeting, November, 1927, Hotel Commodore, N. Y.

RAILWAY CAR DEPARTMENT OFFICERS' ASSOCIATION.—A. S. Sternberg, Belt Ry. of Chicago, Polk and Dearborn Sta., Chicago. Annual convention, August 23-25, 1927, Hotel Sherman, Chicago. Supply Men's Association.—B. S. Johnson, W. H. Miner, Inc., 209 S. La Salle St., Chicago.

RAILWAY CLUB OF PITTSBURGH.—J. D. Conway, 515 Grandview Ave., Pittsburgh, Pa. Regular meetings, 4th Thursday in each month, except June, July and August, Fort Pitt Hotel, Pittsburgh, Pa.

RAILWAY ELECTRICAL SUPPLY MANUFACTURERS' ASSOCIATION.—Edward Wray, 9 S. Clinton St., Chicago. Meets with Association of Railway Electrical Engineers, Oct. 25-28, Hotel Sherman, Chicago.

RAILWAY EQUIPMENT MANUFACTURERS' ASSOCIATION.—F. W. Venton, Crane Co., 836 S. Michigan Ave., Chicago. Meets with Traveling Engineers' Association, September, 1927.

RAILWAY FIRE PROTECTION ASSOCIATION.—R. E. Hackett, Baltimore & Ohio R. R., Baltimore, Md. Annual meeting, October 11-13, 1927.

RAILWAY REAL ESTATE ASSOCIATION.—C. C. Marler, 1243 Transportation Bldg., Chicago.

RAILWAY SUPPLY MANUFACTURERS' ASSOCIATION.—J. D. Conway, 1841 Oliver Bldg., Pittsburgh, Pa. Meets with Mechanical Division and Purchases and Stores Division, A. R. A. No exhibits in 1927.

RAILWAY TELEGRAPH AND TELEPHONE APPLIANCE ASSOCIATION.—G. A. Nelson, 30 Church St., New York. Meets with Telegraph and Telephone Section of A. R. A., Division I.

RAILWAY TREASURY OFFICERS' ASSOCIATION.—L. W. Cox, 1217 Commercial Trust Bldg., Philadelphia, Pa. Annual meeting, Sept. 1-3, 1927, Detroit, Mich.

ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—T. F. Donahoe, Gen. Supvr. Road, Baltimore & Ohio, Pittsburgh, Pa. Annual convention, September 20-22, 1927, Buffalo, N. Y. Exhibit by Track Supply Association.

ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meetings, 2nd Friday in month, except June, July and August.

SIGNAL APPLIANCE ASSOCIATION.—F. W. Edmunds, West Nyack (Rockland Co.), N. Y. Meets with A. R. A., Signal Section.

SOUTHEASTERN CARMEN'S INTERCHANGE ASSOCIATION.—Clyde Kimball, Inman Shops, Atlanta, Ga. Meets semi-annually.

SOUTHERN AND SOUTHWESTERN RAILWAY CLUB.—A. T. Miller, P. O. Box 1205, Atlanta, Ga. Regular meetings, 3rd Thursday in January, March, May, July, September and November, Ansley Hotel, Atlanta.

SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—R. G. Parks, A. B. & A. Ry., Atlanta, Ga.

TRACK SUPPLY ASSOCIATION.—W. C. Kidd, Ramapo-Ajax Corporation, Hillburn, N. Y. Meets with Roadmasters' and Maintenance of Way Association, September, 1927.

TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, Gen. Supt. R. S., New York Central, Buffalo, N. Y. Annual meeting, September 13-16, 1927, Hotel Sherman, Chicago. Exhibit by Railway Equipment Manufacturers' Association.

WESTERN RAILWAY CLUB.—J. W. Fogg (treasurer), vice-pres. of MacLean-Fogg Lock-Nut Co., 2649 N. Kildare Ave., Chicago. Regular meetings, 3rd Monday each month, except June, July and August.

## Traffic

A total of 10,372 people visited the new Pioneer Limited train of the Chicago, Milwaukee & St. Paul which was on exhibit in Chicago on May 16 and 17.

The Canadian National announces the establishment of an office at Washington, D. C. It is at the corner of Fifteenth and Eye streets and is in charge of George L. Bryson, district passenger agent.

The New England Shippers' Advisory Board will hold its regular meeting at Manchester, N. H., on Thursday and Friday, June 9 and 10. On Thursday evening, the members will be entertained at a banquet, at Hotel Carpenter, given by the Manchester Chamber of Commerce and the City of Manchester.

The Southeast Shippers' Advisory Board will hold its eighteenth regular meeting at Mobile, Ala., on June 10. Besides the reports of the various committees, addresses will be made by J. T. Cochrane, president of the Alabama, Tennessee & Northern, and I. B. Tigrett, president of the Gulf, Mobile & Northern.

The Union Pacific is now running a roofless observation car having individual windshields for each seat, between Portland, Ore., and The Dalles, as part of the equipment of the Continental Limited and the Portland Limited. This company plans to use an oil-burning locomotive on this section of the line so that there will be no cinders to annoy the passengers in the open-top cars.

## Smaller Wheat Crop Predicted in Southwest

The wheat crop in Oklahoma this year will yield between 40 and 50 million bushels, a decrease of between 35 and 40 per cent from the record production of last year, and the Texas yield this season will not exceed 12 million bushels, which will be about 30 per cent of last year's production, due to insect infestation and hail damage, in addition to severe drought conditions which have prevailed in north Texas and northwest Oklahoma for the past 60 days, according to reports made at the fifteenth regular meeting of the Southwest Shippers' Advisory Board at Amarillo, Texas, on May 21. Considerable attention was given to the transportation of wheat in this territory due to the speeding up of harvesting as a result of the extended use of the combined thresher. The railroads are accumulating cars and elevator facilities have been enlarged.

It was reported that Kansas, Nebraska and other western states have prospects for a good wheat crop and it is possible that the export movement to gulf ports this season will closely approximate that of 1924. Reports indicate an increase of 10 per cent in shipments of grain, particularly for export throughout the month of June; an increase during the next three months

of 5 per cent in the shipments of grain products, 35 per cent in cotton shipments, 7 per cent in cottonseed products, 15 per cent in fruits and vegetables, 8 per cent in petroleum products, 5 per cent in sugar and molasses, 7 per cent in cement, 15 per cent in brick and clay products, 5 per cent in paper and paper products, and 7 per cent in shipments of salt. The only decreases anticipated are in shipments of live-stock which are expected to be 20 per cent less than last year; sand, gravel and stone 10 per cent less, lumber and forest products 9 per cent less, and fertilizer shipments 25 per cent less. The next meeting of the board will be held in September at Beaumont, Texas.

### Increased Distribution of Fruits and Vegetables

That consumption of fruits and vegetables by the American public is now almost twice what it was ten years ago, is shown by a study just completed by the Bureau of Railway Economics as to rail shipments of the 16 principal fruits and vegetables.

In the years 1917-1919 the annual average rail shipments of the 16 principal fruits and vegetables amounted to 478,540 carloads. For 1924, 1925 and 1926 production had increased to the point where the annual average rail movement was 848,099 carloads, an increase of 77 per cent compared with ten years ago. The total population of the country during that period increased only 12 per cent.

The bulletin shows the wide rail distribution of these 16 fruits and vegetables. The city of Chicago, for instance, in 1925 was served with white potatoes shipped by rail from 37 states, sweet potatoes from 16 states, cabbage from 22 states, onions from 20 states, lettuce from 13 states, tomatoes from 17 states, cantaloupes from 14 states, apples from 25 states, peaches from 19 states and strawberries from 15 states. "These facts, which indicate the wide rail distribution of agricultural products, and the great increase during recent years leads to the conclusion that the transportation service rendered to these products by the railways has been adequate, and that the transportation charges have not been too high," the Bureau Bulletin says. "It is certain that agricultural commodities could not be transported the long distances which they travel nor would they show the greatly increased shipments which they do, were the freight rates charged for their transportation excessive or out of line with the prices received at the markets."

## Equipment and Supplies

### Locomotives

THE GREAT NORTHERN is constructing four locomotives in its own shops.

THE CHICAGO, SPRINGFIELD & ST. LOUIS is expected to enter the market for two freight locomotives.

THE ALABAMA STATE DOCKS have ordered one six-wheel switching locomotive from the American Locomotive Company.

THE ILLINOIS CENTRAL has ordered 15 eight-wheel switching locomotives from the Baldwin Locomotive Works. Inquiry for this equipment was reported in the *Railway Age* of May 7.

### Freight Cars

THE GREAT NORTHERN will construct 800 box cars in its own shops.

THE GREAT NORTHERN is inquiring for 250 all steel coal cars of 70 tons' capacity.

THE NORFOLK & WESTERN is rebuilding 50 all steel gondola cars of 90 tons' capacity, at its Roanoke shops.

THE AMERICAN REFRIGERATOR TRANSIT COMPANY will make heavy repairs to 160 refrigerator cars in its own shops.

THE READING has ordered 500 gondola cars from the Bethlehem Steel Company and 500 gondola cars from the Standard Steel Car Company. Inquiry for this equipment was reported in the *Railway Age* of May 7.

### Passenger Cars

THE GREAT NORTHERN is inquiring for 10 passenger car underframes.

THE CHICAGO, MILWAUKEE & ST. PAUL is inquiring for 10 gas-electric combination passenger and baggage cars.

THE MUKDEN-HAILUNG (China) is inquiring through the car builders for 20 steel underframes for passenger cars.

THE SEABOARD AIR LINE is inquiring for from 10 to 12, 73-ft. gas-electric combination passenger and baggage cars, 10 to 12, 60-ft. gas-electric baggage cars and 20 to 24, 69-ft. trailer cars.

### Machinery and Tools

THE NEW YORK CENTRAL is inquiring for two 20-ton locomotive cranes.

THE SOUTHERN PACIFIC has ordered one 25-ton locomotive crane and one 7-ton gasoline crane from the American Hoist & Derrick Company.

### Signaling

THE CANADIAN NATIONAL has placed an order with the Chicago Railway Signal & Supply Company for 22 three-light and 4 two-light color-light signals, 21 instrument cases and 108 relays.

THE NORTHERN PACIFIC has placed an order with the Chicago Railway Signal & Supply Company for materials for the installation of color-light signals between Whitehall, Mont., and Logan, 38 miles, and between Butte, Mont., and Warm Springs, 25 miles, including 82 three-light and 4 two-light signal heads, 45 instrument cases and 190 relays.

THE INTERSTATE COMMERCE COMMISSION has issued a decision on the complaint of the Ogden (Utah) Grain Exchange, finding not unreasonable the rates on grain from points on the Oregon Short Line in Idaho, Montana, Oregon, Utah and Wyoming, from points in Utah on the Bamberger Electric, Denver & Rio Grande Western, Los Angeles & Salt Lake, Southern Pacific, Union Pacific, Utah Idaho Central and Western Pacific, and from certain points on the Denver & Rio Grande Western in Colorado, to north Pacific coast and California terminals, with the exception of a few points to and from which new rates are prescribed as reasonable. Certain relationships in present rates on this traffic to Portland, Oregon, on the one hand, and to Astoria, Oregon and Seattle, Wash., on the other, are required in connection with the prescribed rates. Rates on the same commodities from the same points of origin to destinations in interior California, the Imperial Valley and Arizona are found unreasonable and new bases of rates are prescribed. The allegation of undue prejudice of complainant's members in the origin territory as compared with Montana shippers on grain and grain products to north Pacific coast points is found not sustained.

## Domestic Railway Purchases of Locomotives, Freight Cars, Passenger Cars, Structural Steel and Rails

|                   | Locomotives |      | Freight Cars |        | Passenger Cars |      | Structural Steel |        | Rails   |         |
|-------------------|-------------|------|--------------|--------|----------------|------|------------------|--------|---------|---------|
|                   | 1927        | 1926 | 1927         | 1926   | 1927           | 1926 | 1927             | 1926   | 1927    | 1926    |
| January           | 96          | 60   | 17,196       | 11,531 | 314            | 217  | 6,417            | 6,545  | 20,000  | 20,000  |
| February          | 85          | 13   | 4,185        | 11,353 | 246            | 159  | 690              | 5,908  | 68,500  | 46,200  |
| March             | 70          | 407  | 5,253        | 9,772  | 212            | 119  | 12,150           | 12,010 | .....   | .....   |
| April             | 97          | 48   | 3,362        | 4,490  | 6              | 225  | 6,120            | 5,895  | 12,900  | .....   |
| May               | 194         | 50   | 4,979        | 435    | 261            | 30   | 17,695           | 21,200 | .....   | 21,540  |
| Total five months | 392         | 578  | 34,974       | 36,581 | 1,039          | 736  | 43,202           | 54,648 | 106,600 | 147,740 |



## Supply Trade

The Joy-Tarbell Lumber Company, Chicago, has opened a yard in that city for the distribution of railroad lumber.

A. O. Woerner, representative of the Scullin Steel Company, St. Louis, Mo., has been appointed assistant vice-president.

The Falk Corporation, Milwaukee, Wis., has opened an office at 122 South Michigan avenue, Chicago, in charge of C. H. Thomas.

The Interstate Iron & Steel Company, Chicago, will construct a furnace building 129 feet by 145 feet at 11018 Burley Avenue.

Charles McNicholl, division traffic manager of the American Bridge Company, has been appointed traffic manager with headquarters at Pittsburgh, Pa.

T. F. Carlin has been appointed eastern sales manager of the Louisville Frog & Switch Company, Louisville, Ky., with headquarters at Washington, D. C.

The American Steel & Wire Company has awarded a general contract for the construction of a warehouse 100 feet by 150 feet at Anderson, Ind., to Ben Wright.

The North American Car Corporation has opened a district office at Dallas, Texas, in charge of R. W. Patterson, formerly a representative in the export department at New Orleans, La.

The American Steel & Wire Company, Minerva, Ohio, with an authorized capitalization of \$1,000,000, has been incorporated. J. C. Lewis is president; Arthur Koch, treasurer and E. F. Rinoehl, secretary. The corporation will manufacture a varied line of safety switches, panels and switch boards.

Roy Dixon has been appointed railway representative of the Charles R. McCormick Lumber Company, San Francisco, Cal. Mr. Dixon's headquarters are at the New York office, 17 Battery Place. He succeeds Mason Kline who has resigned to enter other business. Mr. Dixon was formerly Mr. Kline's assistant.

The Lincoln Electric Company, Cleveland, Ohio, has appointed the Wade Engineering Company, Los Angeles, Cal., its distributor for California. The Big Three Welding & Equipment Company, Fort Worth, Texas, which is the distributor of the Lincoln Electric Company in Texas and Oklahoma, has opened a warehouse branch at Tulsa, Okla.

Theodore F. Merseles, president of Montgomery Ward & Co., Chicago, has resigned to become president of the

Johns-Manville Corporation, New York, to succeed H. E. Manville, who will be elected chairman of the board. George Whitney and Francis D. Bartow, partners in J. P. Morgan & Co., in addition to Theodore F. Merseles, have been elected directors of the Johns-Manville Corporation.

The Chipman Chemical Engineering Company, Bound Brook, N. J., has established a factory at Winnipeg, Manitoba to enable it to serve the Canadian railways better and particularly to aid in the execution of a contract for the treatment of approximately 2,700 miles of the Western lines of the Canadian Pacific with Atlas "A" and Atlas "NP" weed killer. This company has also opened a Canadian office in the Trust and Loan building, Winnipeg, with J. D. Ruttan in charge.

C. C. Chesney, manager of the Pittsfield works, W. R. Burrows, associate manager of the incandescent lamp department and C. E. Eveleth, manager of the Schenectady works of the General Electric Company, Schenectady, N. Y., have been elected vice-presidents, taking on responsibilities in the manufacturing department. F. C. Pratt, vice-president in charge of manufacturing, and H. F. T. Erben, assistant vice-president of the manufacturing department, have retired; W. S. Moody, in general charge of the transformer engineering department of the company since its inception, has been appointed a consulting engineer for all transformer departments of the company and for all departments of the Pittsfield works; F. W. Peek, Jr., a consulting engineer in the transformer department and in charge of the high voltage testing laboratory, has been appointed engineer of the general transformer department to succeed Mr. Moody; Chester W. Rice, who has been engaged in development work in the research laboratory, has been appointed assistant to E. W. Allen, vice-president in charge of engineering; Mr. Rice will give special attention to new developments. The General Electric Company has appointed an engineering council to include E. W. Rice, Jr., honorary chairman (ex-officio); E. W. Allen, chairman; Elihu Thomson, A. C. Davis, W. R. Whitney, W. L. R. Emmet, C. C. Chesney and C. E. Eveleth.

## Obituary

P. William Kromer, Buffalo district manager of the Air Reduction Sales Company, New York, died at the Buffalo General Hospital on May 21, at the age of 47, following an illness of five weeks. Mr. Kromer had been identified with the oxyacetylene industry for nearly 20 years, of which 11 years were with the Air Reduction Sales Company.

Immediately prior to his connection with the Air Reduction Sales Company in 1916, he was the local manager of the Niagara Oxygen Company. His previous experience had been with the Searchlight Company and other producers of gases, and as manager of a job welding shop in Binghamton, N. Y.

George C. Murray, formerly president of the Keyoke Railway Equipment Company, Chicago, who died on May 22, was born on September 27, 1866. He became connected with the Simplex Railway Appliance Company in 1902, and was engaged by the American Steel Foundries, Chicago, when the latter company absorbed the Simplex



G. C. Murray

organization in 1905. Patents were obtained by Mr. Murray in 1909 and 1910 on the Murray draft gear and the Murray Keyoke and at this time he formed and became president of the Keyoke Railway Equipment Company. He remained president of this company until about two years ago when he gave up all business activities on account of ill health.

## Trade Publications

INUNDATION CENTRAL MIXING PLANTS.—The Blaw-Knox Company, Pittsburgh, Pa., has issued a comprehensive catalogue of 36 pages dealing with the principal of inundation for the control of the water-cement ratio and the production of constant concrete, and also describing and illustrating its system and equipment for mechanically applying the principal of inundation at central mixing plants.

BULK STORAGE TANKS.—A 48-page catalog has been issued by the Graver Corporation, of East Chicago, Ill., describing and illustrating its extensive line of steel tanks for practically every type of bulk storage layout. Specifically, aside from its many illustrations, the catalog contains drawings of a number of bulk station layouts, a list of standard tank sizes with specifications for each type, information with regard to storage plant fittings and structural steel tank supports, together with information with regard to the care of tanks and their unloading and erecting.



## Construction

**CALIFORNIA, ARIZONA & SANTE FE.**—The Interstate Commerce Commission has issued a certificate authorizing the construction of an extension from Beardsley for a distance of about 15 miles in Maricopa County, Arizona.

**CHICAGO, ROCK ISLAND & PACIFIC.**—A contract has been let to Joseph E. Nelson & Sons, Chicago, for the construction of a six-stall brick addition to the roundhouse at Amarillo, Tex., at an estimated cost of about \$40,000.

**DETROIT, TOLEDO & IRONTON.**—A contract has been let to the Handysite Construction Company, Detroit, Mich., for the construction of culverts and grade separation structures in the vicinity of Napoleon, Ohio, and Malinta on the line of the cut-off between Malinta, Ohio, and Durban, Mich. Work under this contract will be performed at an approximate cost of \$500,000.

**PITTSBURGH & WEST VIRGINIA.**—The Interstate Commerce Commission has permitted the Pennsylvania Railroad to intervene as a party to the proceedings on this company's application for authority to build an extension from Cochran's Mill to Connellsville, Pa.

**OREGON TRUNK.**—W. F. Turner, president of this company, has notified the Interstate Commerce Commission of the acceptance of the terms and conditions of the commission's order of May 11 authorizing the construction of a line from Bend south to Klamath Falls, Ore. The company agrees to construct the line and complete it in two years and says that the matter of avoiding, as far as possible, duplication of construction, has been taken up with the Southern Pacific as suggested by the commission.

**ST. LOUIS-SAN FRANCISCO.**—The Citizens Bond Issue Supervisory Committee has approved plans for the construction of a reinforced concrete viaduct over the line of this company at Ellendale avenue, St. Louis, Mo., to cost approximately \$531,000. The Frisco will contribute \$300,000 of the cost of the viaduct.

**SOUTHERN PACIFIC.**—A contract for the paving of team tracks and driveways at the freight station at Bakersfield, Cal., has been awarded to the Union Paving Company, Bakersfield, at a cost of \$18,300.

**UNION PACIFIC.**—This company plans the construction of a car repair shed at Albina, Ore., at a cost of about \$50,000.

## Railway Finance

**CANADIAN NATIONAL.—Grand Trunk Pacific Receivership.**—It was stated last week in Ottawa by the Minister of Railways and Canals that the Grand Trunk Pacific receivership would be abolished almost immediately. Last session, Parliament approved the agreement concluded last August between the Canadian National and the Grand Trunk Pacific debenture holders in London, England. The agreement provided that such of the debentures as were in the hands of the public, amounting to a little over £7,000,000, should be taken up by a new issue of Canadian National debentures, the new issue to bear interest at 2 per cent per annum, with a further provision that 2 per cent should be placed in a sinking fund to be used for the gradual retirement of the debentures. The exchange of those new debentures for the old ones has been practically completed and all that remains now to end the receivership, which has continued for over ten years, are certain minor legal formalities. These, it is expected, will be complied with this week, after which the Grand Trunk Pacific will legally be part of the Canadian National. From an operating standpoint it has been an integral part of that system since the latter was formed by a consolidation of the various roads now composing it.

**CAROLINA SOUTHERN.—Securities.**—The

Interstate Commerce Commission has authorized this company to issue \$100,000 of common stock, \$50,000 of preferred stock and \$65,000 of 6 per cent promissory notes.

**CENTRAL NEW ENGLAND.—Absorbed by New Haven.**—The New York, New Haven & Hartford which has controlled this line for a number of years has issued an order that, effective June 1, the former Central New England line between Hartford and Simsbury and between Tariffville and Agawam Junction will become part of the Hartford division of the New Haven and the line between Simsbury and the east yard limit at Winsted is to become a part of the New Haven division and the remainder of the Central New England is to become a part of the Danbury division. With the allocation of these various divisions of the Central New England to the various divisions of the New Haven the old road officially went out of existence.

**CHESAPEAKE & OHIO.—Dividends.**—The directors of this road on May 26 declared a quarterly dividend of \$2.50 a share on the common stock, placing it on a \$10 annual basis. The dividend is payable July 1 to stock of record June 8.

**CHESAPEAKE & OHIO.—I. C. C. Hearings.**—Hearings on the application of this

company for authority to acquire stock control of the Erie and Pere Marquette were resumed at Washington on June 1 before C. D. Mahaffie, director of the Bureau of Finance of the Interstate Commerce Commission. Several witnesses on behalf of the C. & O., who had previously testified were re-called to furnish additional information which had been called for by counsel for the protesting minority stockholders of the C. & O., and for additional cross-examination. When C. & O. counsel objected to questions put to E. M. Thomas, comptroller of the C. & O., regarding the purchase of the stock of the Greenbrier & Eastern, on the ground that that is involved in a separate proceeding before the commission, Henry W. Anderson, of counsel for the minority, said he desired to show that the C. & O. had been "buying railroads on a speculative basis, in disregard of the interests of the stockholders and of the public." Mr. Mahaffie said that the witness had not testified on the subject directly but that he might answer. Mr. Thomas replied that the transactions had not yet been completed and therefore had not reached the accounting department. I. L. Pyle, assistant chief engineer of the C. & O., produced details of an estimate of the cost of improving the Chicago division to handle heavy traffic, amounting to approximately \$30,000,000, which President Harahan had referred to in his statement that control of the entire Erie might be purchased for only a few millions more. He was cross-examined regarding the method of making up the estimate and asked to produce the complete correspondence file relating to it.

**CHICAGO & EASTERN ILLINOIS.—Valuation.**—The Interstate Commerce Commission has postponed indefinitely the oral argument on the tentative valuation of this company's property, which had been assigned for June 23 before Division 1.

**ERIE.—Bonds.**—The Interstate Commerce Commission has authorized an issue of \$50,000,000 of refunding and improvement mortgage 5 per cent bonds, to be sold at not less than 91½.

The bonds are to be issued in part in exchange for \$40,000,000 of refunding and improvement mortgage 6 per cent bonds and the proceeds are to be used to pay \$20,299,450 of 6 per cent notes to the United States, \$10,050,000 of 4½ per cent notes maturing July 1, 1928, and other obligations, while it was proposed to reserve \$5,185,550 to provide funds for a portion of the 1927 budget program for additions and betterments, estimated at \$10,000,000, exclusive of equipment. It was also proposed to use \$2,000,000 as cash payment on equipment under the 1927 program. The report says that from a statement submitted by the company in respect to its cash balances during the past 17 months, "it appears that during that period an average shortage of available cash of about \$625,000 has existed, with a maximum shortage, at any one time, of something less than \$1,500,000, and that as the applicant's statement does not show the necessity for the diversion of \$5,000,000 of the proceeds of the proposed issues for the payment of current

vouchers; our order herein will provide that not exceeding \$1,500,000 of such proceeds shall be devoted to the payment of vouchers, and that not less than \$3,500,000 thereof shall be deposited in a separate account and not expended until the applicant has submitted for our approval a statement showing the general purposes to which said deposit is to be applied."

**FAIRPORT, PAINESVILLE & EASTERN.—Securities.**—The Interstate Commerce Commission has authorized this company to issue \$250,000 of common stock and \$2,000,000 of first mortgage 6 per cent gold bonds, the stock to be sold at par and the bonds at not less than 94.

**HOCKING VALLEY.—Dividend.**—The directors of this road, on May 26, declared a quarterly dividend of \$2.50 a share on the common stock, placing it on a \$10 annual basis. The dividend is payable June 30 to stock of record June 8.

**MAINE CENTRAL.**—See St. Johnsbury & Lake Champlain.

**MUSKOGON RAILWAY & NAVIGATION COMPANY.—Bonds.**—The Interstate Commerce Commission has authorized this company to issue \$148,100 of first mortgage 6 per cent gold bonds in lieu of a like amount of such bonds which were issued without the commission's authority under an impression that the issue had been duly authorized by the Michigan Public Utilities Commission.

**NEW YORK, NEW HAVEN & HARTFORD.—Equipment Trust.**—This company has been authorized by the Interstate Commerce Commission to assume obligation and liability in respect of an issue of \$6,660,000 of equipment trust certificates, to be issued at par and accrued dividends.

**PENNSYLVANIA.**—See Western New York & Pennsylvania.

**PENNSYLVANIA.—Valuation Hearing.**—Hearings on the Interstate Commerce Commission's tentative valuation reports on the properties of the Pennsylvania Railroad and 26 of its subsidiaries were begun on June 1 before Examiners Gibson and Woodrow.

**PERE MARQUETTE.—Stock Dividend.**—A 20 per cent common stock dividend was formally declared by directors of this road on May 26, the dividend being payable on October 1 to stock of record September 7.

**ST. JOHNSBURY & LAKE CHAMPLAIN.—Termination of operation of part of line by Maine Central.**—Notice was issued on May 25 that the lease by this road to the Maine Central of that portion of its line extending from Lunenburg, Vt., to St. Johnsbury, will terminate and operation of said railroad by the Maine Central will cease at midnight of July 31, 1927.

**SEABOARD AIR LINE.—Acquisition.**—The Interstate Commerce Commission has authorized the Jacksonville, Gainesville & Gulf to acquire a line from Sampson to Emathla, Fla., and to issue \$5,000 of stock and \$450,000 of first mortgage 6 per cent 25-year bonds. The commission

has also authorized the Seaboard to acquire control of the J. G. & G., by purchase of its stock and to assume obligation for the bonds.

**Abandonment.**—The commission has authorized the Seaboard to abandon a line from Ekal to Sumterville, Fla., 2.24 miles.

**SOUTHERN PACIFIC.—Oregon Lines Bonds.**—The Interstate Commerce Commission has authorized this company to acquire the lines of the Oregon & California and the Marion & Linn County, on terms and conditions prescribed in the order, and to issue \$61,294,000 of Oregon Lines first mortgage bonds, against these lines and other lines of the Southern Pacific system in Oregon, to reimburse the treasury for expenditures over a period of years.

**SOUTHERN PACIFIC.—Tentative Valuation.**—The Interstate Commerce Commission has issued a tentative valuation report covering the lines of the Pacific system finding the final value of the total owned carrier property to be \$107,434,000 and that of the total used carrier property to be \$477,439,910, as of June 30, 1916. The latter figure includes \$380,217,910 for leased lines, of which \$163,250,000 is assigned to the Central Pacific and \$165,000,000 to the Southern Pacific Railroad. The Texas and Louisiana lines have been covered in separate reports. The final value of the carrier property wholly owned and used is placed at \$97,222,000. Of the owned property that valued at \$10,212,000 is leased to other companies. The outstanding capitalization on valuation date was \$556,825,791 and its investment in road and equipment was stated in its books as \$112,099,691, but in addition to its carrier property it held \$888,171,765 par value of securities of and other investments in other companies, recorded in its accounts at \$560,391,623 book value. Cost of reproduction new of the carrier property exclusive of land was placed at \$89,830,393 for the property owned and \$434,029,831 for that used. The cost of reproduction less depreciation was placed at \$74,858,883 for the property owned and \$347,146,975 for that used. The present value of 165,955 acres of carrier lands used was placed at \$98,746,441.

**Statement of H. W. de Forest.**—In connection with the tentative valuation referred to above, H. W. de Forest, chairman of the executive committee of the company authorized the following statement:

The tentative valuation just issued by the Interstate Commerce Commission relates to values of June 30, 1916. It is not, and does not purport to be, a valuation of the property of the Southern Pacific Transportation System. It covers only property directly owned by the Southern Pacific Company, together with that of certain proprietary companies directly operated by that company under lease.

It does not include properties controlled by stock ownership, such as the Southern Pacific Lines in Texas and Louisiana, the Arizona Eastern and Phoenix & Eastern Lines in Arizona, all of which constituted on June 30, 1916, and now constitute a part of the Southern Pacific Transportation System. All of these lines are being separately valued.

Nor does it include the various lines acquired subsequent to June 30, 1916, which have been separately valued, such as the El Paso & Southwestern System, including the Arizona & New Mexico Railway Company, the San Antonio & Aransas Pass Railway Company, the Franklin

and Abbeville Railway Company and the Dayton-Goose Creek Railway Company.

The valuation reported also does not include any portion of the value of certain properties in which the Southern Pacific Company and its affiliated companies had as of the valuation date and now have large investments, nor does it include the value of such investments. Among such properties in which the Southern Pacific Company and its affiliated companies are so interested are the Southern Pacific Railroad Company of Mexico, the Pacific Electric Railway Company and other electric railway companies in California, the Pacific Fruit Express Company, the Northwestern Pacific Railroad Company, the Sunset Railway Company and the San Diego & Arizona Railway Company (of which last named four companies the Southern Pacific Company owns one-half of the capital stock); also various terminal, oil, land, coal and other companies.

The tentative valuation does not include additions and betterments and road extensions subsequent to the valuation dates of the different Southern Pacific Transportation System properties the expenditures for which, to the end of the year 1926, have been in excess of \$350,000,000. It does not include any non-carrier properties or interests of the Southern Pacific Company or of any Southern Pacific transportation line in the securities of other carriers or corporations.

Moreover, as stated therein, the tentative valuation purports to give the value of the properties included therein only for rate-making purposes as of June 30, 1916. It is not presented by the Interstate Commerce Commission as the market or exchange or commercial value of the properties appraised.

Further, the tentative valuation is not a fair or adequate representation of the value of the properties included therein.

It does not include the value of certain lands and structures which have been classified by the Commission as non-carrier, a considerable part of which has been erroneously so classified; it does not include all the working capital, including cash and material and supplies, held as of valuation date for common carrier purposes. It is based upon inadequate unit prices and it contains no, or an insufficient, allowance for going concern value and other values and elements of value. The value reported is based upon prices prevailing during a period of years prior to 1914, rather than upon prices prevailing as of the respective valuation dates. Although estimates of cost of reproduction of other property are based upon prices prior to 1914, common carrier lands are stated to be valued as of valuation date, June 30, 1916. The Commission admits this discrepancy and states that it will be removed, when it adjusts to later dates the final values reported in the tentative valuations. Excessive amounts have been deducted for depreciation under the theoretical straight line method, in disregard of actual conditions as well as of the rules and principles on the subject of depreciation contained in the decisions of the Supreme Court of the United States.

The Southern Pacific Company will decline to accept the Commission's report as representing the fair value of the properties included in the tentative valuation, and, availing itself of the right granted by the Federal Valuation Act, it expects to file the statutory protest and to present its claims for higher values which it believes are supported by the facts and sustainable under the decisions of the Supreme Court of the United States.

**WESTERN NEW YORK & PENNSYLVANIA.—Funded Debt.**—Announcement was made May 27 that the directors of the Pennsylvania Railroad had authorized negotiations with the Western New York & Pennsylvania with the view to reducing its funded and floating debt. The present first mortgage and general mortgage bonds and equipment trust obligations will remain outstanding, unchanged. Approximately 25 million dollars of debt incurred for improvements will be financed through the issue of new common stock. The present income bonds and capital stock will be exchanged for a reduced amount of new preferred stock. The funded and floating debt of the Western New York & Pennsylvania is equal to about 73 per cent of its total capitalization, the remaining 27 per cent being represented by common capital stock. Effective with the new plan the funded debt will be reduced to approximately 40 per cent of the total capitalization with 60 per cent in capital stock. The Pennsylvania holds all but a small margin of the common stock and income bonds and for the purpose of improv-



ing the capital structure of the Western New York & Pennsylvania, the Pennsylvania will consent to a marked reduction in the par value of the present common capital stock and income bonds by an exchange of both for new preferred stock as well as agreeing to accept new common capital stock for construction advances.

**WHEELING & LAKE ERIE.—Election of Directors.**—Frank E. Taplin, C. F. Taplin and George Fillius, all of Cleveland, were elected, May 26, to the board of directors of this road. C. F. Taplin and George Fillius are attorneys for Frank E. Taplin who is the chairman of the Pittsburgh & West Virginia.

**WHEELING & LAKE ERIE.—Directors.**—The Interstate Commerce Commission has permitted the Wabash and the Pittsburgh & West Virginia to intervene and be treated as parties to the proceedings on the applications filed by officers and directors of the Baltimore & Ohio, New York Central and New York, Chicago & St. Louis for authority to serve as directors of the Wheeling & Lake Erie. Hearing on the applications has been postponed to June 20.

#### Average Price of Stocks and Bonds

|   | May 31 | Last week | Last year |
|---|--------|-----------|-----------|
| Average price of 20 representative railway stocks.. | 115.20 | 113.70    | 91.99     |
| Average price of 20 representative railway bonds.   | 94.46  | 94.80     | 91.48     |

#### Valuation Reports

The Interstate Commerce Commission has issued final or tentative valuation reports finding the final value for rate-making purposes of the property owned and used for common-carrier purposes, as of the respective valuation dates, as follows:

| FINAL REPORTS                                    |              |      |
|--|--------------|------|
| Grafton & Upton.....                             | \$521,500    | 1916 |
| Copper Range.....                                | 4,665,180    | 1916 |
| Blytheville, Leachville & Arkansas Southern..... | 357,215      | 1917 |
| McKeesport Connecting.....                       | 1,143,000    | 1917 |
| TENTATIVE REPORTS                                |              |      |
| Southern Pacific (Pacific System).....           | \$97,222,000 | 1916 |
| Staten Island Rapid Transit Co. ....             | 12,882,100   | 1918 |
| Coal & Coke.....                                 | 10,893,700   | 1918 |

#### Dividends Declared

Buffalo & Susquehanna.—Preferred, 2 per cent, semi-annually, payable June 30 to holders of record June 15.  
 Chesapeake & Ohio.—Common, \$2.50, quarterly, payable July 1 to holders of record June 8.  
 Consolidated Railroads of Cuba.—Preferred, \$1.50 quarterly, payable July 1 to holders of record June 10.  
 Cuba Railroad.—Common, \$1.20, quarterly, payable June 28 to holders of record June 28.  
 Erie & Pittsburgh.—\$0.87½, quarterly, payable June 10 to holders of record May 31.  
 Fonda, Johnstown & Gloversville.—Preferred, 1½ per cent, quarterly, payable June 15 to holders of record June 10.  
 Gulf, Mobile & Northern.—Preferred, \$1.50, quarterly, payable July 1 to holders of record June 15.  
 Hocking Valley.—Common, \$2.50, quarterly, payable June 30 to holders of record June 8.  
 Reading Company.—2nd preferred, 1 per cent, quarterly, payable July 14 to holders of record June 20.

**THE WOMEN'S TRAFFIC CLUB** of Los Angeles, held its second annual banquet on Wednesday, May 25, with an address by Dr. F. May Morse, professor of merchandising at the University of Southern California.

## Railway Officers

### Executive

**R. P. Gillham**, vice-president of the Campbell's Creek, with headquarters at Cincinnati, Ohio, has been elected president, with headquarters at the same point. He has been succeeded as vice president by **C. R. Gillham**.

**C. E. Spens**, vice-president in charge of traffic of the Chicago, Burlington & Quincy, and **E. P. Bracken**, vice-president in charge of operation, both with headquarters at Chicago, have also been elected vice-presidents of the Colorado & Southern.

### Operating

**C. W. Brown**, superintendent of the Lehigh & New England, with headquarters at Bethlehem, Pa., has been appointed general superintendent, with headquarters at Philadelphia, Pa. The office of superintendent has been abolished.

**E. E. McCarty**, trainmaster on the Los Angeles division of the Atchison, Topeka & Santa Fe, with headquarters at San Bernardino, Cal., has been promoted to superintendent of the Albuquerque division, with headquarters at Winslow, Ariz., succeeding **J. D. McCully**, granted a leave of absence.

**James J. Butler**, who has been promoted to superintendent of the Chicago & Alton, with headquarters at Bloomington, Ill., began railway service as a fireman on the Alton, entering his first supervisory position in 1911 when he was appointed train rule instructor.



J. J. BUTLER

Two years later he was promoted to road foreman of engines and in 1915 he was further advanced to trainmaster on the Northern division. In 1916 Mr. Butler was appointed assistant to the general manager, becoming assistant

superintendent, with headquarters at Springfield, Ill., in 1917. He remained at Springfield until his transfer to Bloomington during the summer of 1926, a position he held until his promotion to superintendent of the Eastern division on May 1.

**Frederick J. D. Browne**, conductor on the Idaho division of the Northern Pacific, has been promoted to trainmaster on construction, with headquarters at Spokane, Wash. **Evan A. Harris**, conductor on the Idaho division, has been promoted to trainmaster, with headquarters at Spokane.

**L. A. Clapp**, superintendent of the Iowa division of the Chicago & North Western, with headquarters at Boone, Iowa, has been transferred to the Galena division, with headquarters at Chicago, succeeding **F. F. McCauley**, deceased. Mr. Clapp has been succeeded by **E. L. Henry**, assistant superintendent, with headquarters at Clinton, Iowa, who will in turn be replaced by **H. R. Cooke**, trainmaster at Council Bluffs, Iowa. **R. J. Hall**, trainmaster at Boone, has been transferred to Council Bluffs, succeeding Mr. Cooke. Mr. Hall will be replaced by **C. H. Humphries**, chief train dispatcher at Boone.

### Traffic

**T. J. Fretz**, general freight and passenger agent of the Lehigh & New England, with headquarters at Philadelphia, has been appointed traffic manager, with headquarters in the same city.

**W. J. Landon**, assistant general freight agent of the New York, New Haven & Hartford, with headquarters at New Haven, Conn., has in addition been appointed commerce assistant, with the same headquarters. **R. A. Flynn** has been appointed assistant to the freight traffic manager, with headquarters at New Haven, Conn.

**Gordon L. Oliver**, traffic manager of the Muscle Shoals, Birmingham & Pensacola, with headquarters at Pensacola, Fla., has been appointed traffic manager of the Fort Worth & Rio Grande, the St. Louis, San Francisco & Texas and the Paris & Great Northern, subsidiaries of the St. Louis-San Francisco, with headquarters at Fort Worth, Texas, succeeding **W. C. Preston**, resigned. **Charles Thorburn**, soliciting freight agent of the St. Louis-San Francisco, with headquarters at St. Louis, Mo., has been appointed traffic manager of the Muscle Shoals, Birmingham & Pensacola, succeeding Mr. Oliver.

**J. V. Lanigan**, general passenger agent of the Illinois Central, with headquarters



at Chicago, has been appointed passenger traffic manager, with headquarters at the same point. **G. G. Truesdale**, assistant general passenger agent, with headquarters at Chicago, has been appointed general passenger agent, to succeed Mr. Lanigan. **A. C. Linton**, assistant general passenger agent, with headquarters at New Orleans, La., has been appointed general passenger agent, with headquarters at the same point, succeeding **W. H. Brill**, deceased. **S. B. Mitchell**, district passenger agent, with headquarters at New Orleans, has been appointed assistant general passenger agent, to succeed Mr. Linton.

**Albert Cotsworth, Jr.**, general passenger agent of the Chicago, Burlington & Quincy, has been appointed passenger traffic manager, with headquarters at Chicago, succeeding **P. S. Eustis**, retired after more than 50 years in the service of the same company. **John R. Van Dyke**, general agent in the passenger department, with headquarters at Chicago, has been promoted to succeed Mr. Cotsworth. Mr. Cotsworth was born on March 18, 1882, at Burlington, Iowa, and attended high school in that

Burlington). Four years later he became chief clerk in charge of the passenger department where he remained until July, 1881, when he was advanced to general passenger and ticket agent. On June 10, 1888, Mr. Eustis was appointed general passenger agent of the Burlington and on April 8, 1902, he was promoted to passenger traffic manager, a position he has held continuously until the time of his retirement. Mr. Van



P. S. Eustis

Dyke, who has been promoted to general passenger agent, was born on November 19, 1873, at Chicago, and entered railway service in September, 1888, as an office boy in the office of the auditor of ticket accounts of the C. B. & Q. at Chicago. In 1890 he was transferred to the general passenger department at Chicago as general clerk and



A. Cotsworth, Jr.

city for two years, then entering the general passenger department of the Burlington as an office boy on February 2, 1900. For the next six years he filled various clerical positions in the passenger department and on February 1, 1906, he was appointed chief clerk. On March 1, 1920, Mr. Cotsworth was promoted to assistant general passenger agent, with headquarters at Chicago, where he remained until July, 1922, when he was further promoted to general passenger agent, with headquarters at Omaha, Nebr. In December, 1925, Mr. Cotsworth was transferred to Chicago, where he was located at the time of his promotion to passenger traffic manager. Mr. Eustis, who is retiring as passenger traffic manager, was born on February 16, 1857, at Milton, Mass., and was educated in private schools in Philadelphia, Pa. He entered railway service in November, 1876, as an office boy in the freight and passenger department of the Burlington & Missouri River (now a part of the



J. R. Van Dyke

from 1893 to 1918 he served successively as passenger agent, passenger and excursion clerk and traveling passenger agent. During Federal control Mr. Van Dyke acted as agent in charge of the Burlington unit of the Chicago consolidated ticket office. In April, 1920, he was appointed general agent in the passenger department of the Burlington at Chicago, a position he held until his promotion to general passenger agent on June 1.

## Engineering, Maintenance of Way and Signaling

**Porter Allen**, who has been promoted to Chief engineer, maintenance of way, of the Western region of the Pennsylvania, with headquarters at Chicago, was born at Williamsport, Pa., on August 15, 1880, and graduated from Lafayette College in 1902. Mr. Allen's entire railway service has been with the Pennsylvania, beginning on June 21, 1902, when he entered the office of the principal assistant engineer at Williamsport, Pa., as a rodman. In August of the same year he was transferred to Elmira, N. Y., being advanced to transitman at Altoona, Pa., in 1905. Mr. Allen was transferred to the operating department on March 10, 1906, as an



Porter Allen

assistant superintendent at Washington, Pa., and in September, 1908, he was transferred to Lancaster, Pa., where he remained until August 1, 1911, when he was appointed supervisor at Uniontown, Pa. From May 1, 1915, to September 16, 1918, he served in this capacity on the Buffalo division at Olean, N. Y., and on the Middle division and he was then promoted to division engineer of the Cleveland and Pittsburgh division of the Central region, with headquarters at Cleveland, Ohio. In 1923, Mr. Allen returned to the operating department as superintendent of the South Bend division, with headquarters at Logansport, Ind., being transferred to the Norfolk division, with office at Cape Charles, Va., in the following year and to the Eastern division of the Central region, with headquarters at Pittsburgh, Pa., in September, 1926. He remained at this point until his promotion to chief engineer, maintenance of way, of the Western region on June 1.

## Obituary

**Harrie B. Herendeen**, auditor of the Ft. Smith & Western, died on May 16 at Ft. Smith, Ark., of heart disease. Mr. Herendeen was born on May 12, 1871, at Burton, Ohio, and entered rail-

way service in 1888 with the Pittsburgh, Painesville & Fairport (now a part of the Baltimore & Ohio). During the period from 1891 to 1900 he served with the New York, Chicago & St. Louis, becoming auditor of the Ft. Smith & Western soon after its organization in 1901. Mr. Herendeen had been auditor of this company continuously from 1901 to the time of his death.

**Edwin Hale Abbot**, retired railroad executive, died on May 30 at his home in Cambridge, Mass., at the age of 93, after a prolonged illness. Mr. Abbot was born in January, 1834, at Beverly, Mass., and was educated at Harvard University, from which he received an academic degree in 1858 and a degree from the Harvard Law School in 1862. He began his railroad career in the West, in 1876, and became general solicitor and a director of the Wisconsin Central (now a part of the Minneapolis, St. Paul & Sault Ste. Marie). In 1878, he served as president and trustee, operating the Wisconsin Central for bondholders. He originated the voting trust method of corporate control. In addition, he constructed the Wisconsin Central's associated lines and erected the Grand Central station and terminals in Chicago, with Charles L. Colby. From 1890 to 1899 Mr. Abbot served as president of the Wisconsin Central, the Chicago, Wisconsin & Minneapolis and the Milwaukee & Lake Winnebago. He retired from active duties in 1909 after having effected an amicable union of all the Wisconsin Central roads into one company, and established with W. W. Crapo the first car-ferry for entire trains (54 miles) across Lake Michigan, between Manitowoc and Ludington. He was also a director of the Atchison, Topeka & Santa Fe and the Northern Pacific during the period from 1887 to 1893.

**Ernest Stenger**, former general superintendent of the Union Pacific and since 1920 treasurer, receiver and president of the Denver Tramway Company and president of the Denver & Intermountain, died on May 28 at Denver, Colo., after a short illness from pneumonia. Mr. Stenger was born in 1865 at Colmar, Alsace, France, coming to Columbus, Neb., at the age of six years. He graduated from the University of Michigan in 1886 and entered railway service in the same year as a rodman on the Burlington & Missouri River (now a part of the Chicago, Burlington & Quincy) in Nebraska. In 1888 he became a draftsman on the Atchison, Topeka & Santa Fe and two years later he was appointed assistant engineer on the Missouri Pacific. Mr. Stenger was appointed a division engineer on the Union Pacific in 1900, later being transferred to the operating department where he served as assistant superintendent and as superintendent, where he remained until 1907 when he became a general superintendent of the Rio Grande Western (now the Denver & Rio Grande Western). From March, 1911, to 1917, Mr. Stenger was general manager of the St. Joseph &

Grand Island and the St. Joseph Terminal, with headquarters at St. Joseph, Mo. He then was appointed general superintendent of the Union Pacific, with headquarters at Omaha, Neb., remaining in that position until he left steam railroad service in 1920 to become receiver and treasurer of the Denver Tramway Company. With the reorganization of the company he was elected president, serving in this capacity and as president of the Denver & Intermountain until the time of his death.

**C. G. Juneau**, master car builder of the Chicago, Milwaukee & St. Paul, died at his home in Milwaukee, Wis., from heart trouble on May 26. Mr. Juneau was born on December 12, 1874, at Milwaukee, and entered railway service with the C. M. & St. P. as a blacksmith apprentice in the car and locomotive departments. He completed this apprenticeship on October 1, 1899, and for the next year he was employed by the Strobel Structure Company, Chicago, as a tool dresser, returning to the car department of the Milwaukee on July 21, 1900. Six years later Mr. Juneau was appointed assistant foreman of the blacksmith shop, where he remained until March 1, 1918, when he was further advanced to general foreman of the car blacksmith department for the entire system. On June 1, 1918, he was promoted to general superintendent of the freight car department, including the blacksmith department, and in March, 1920, he was again promoted to take charge of the Milwaukee terminal and shop district. Mr. Juneau was appointed acting master car builder, with headquarters at Milwaukee, on June 1, 1920, becoming master car builder on August 1, a position he held continuously until the time of his death.

**William S. Dawley**, consulting engineer who died at St. Louis, Mo., on May 18, was born on November 26, 1856, at Stockton, Wis., and was graduated from the University of Minnesota in 1879. In the same year he entered railway service as a rodman on construction on the Minneapolis & St. Louis, advancing to assistant engineer before he became engaged in surveying on the St. Paul, Minneapolis & Manitoba (now a part of the Great Northern) and the Minneapolis, Sault Ste. Marie &

Atlantic (now the Minneapolis, St. Paul, Sault Ste. Marie) in 1883. Later he was appointed locating engineer on the Wisconsin, Minnesota & Pacific (now a part of the Chicago Great Western). From 1885 to May, 1894, Mr. Dawley served as locating engineer and assistant engineer in charge of construction of the Chicago & Eastern Illinois, and on the latter date he was appointed chief engineer. He served in this capacity and as engineer of maintenance of way, performing the duties of chief engineer until 1906, when he was appointed chief engineer of the Missouri & North Arkansas, with headquarters at St. Louis. Mr. Dawley became chief



W. S. Dawley

engineer of the Yunnan-Szechuan & Tengyueh Railway in Southwestern China in 1909. There he made location surveys for a seaport connection for Yunnan Fu, Yunnan Province, and for a line north from Canton. On his return to the United States, in 1913, Mr. Dawley became associated with Bion J. Arnold in the preparation of a report on the steam railroads of Chicago. Following this work he made surveys used as the basis of terminal improvement at Flint, Mich., and in 1917 he was again associated with Mr. Arnold in a study of the Baltimore, Md., terminals. At the time of his death he was engaged on valuation work for the Missouri & North Arkansas. Mr. Dawley was the first treasurer of the American Railway Engineering Association, serving in that capacity from 1899 to 1909.



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